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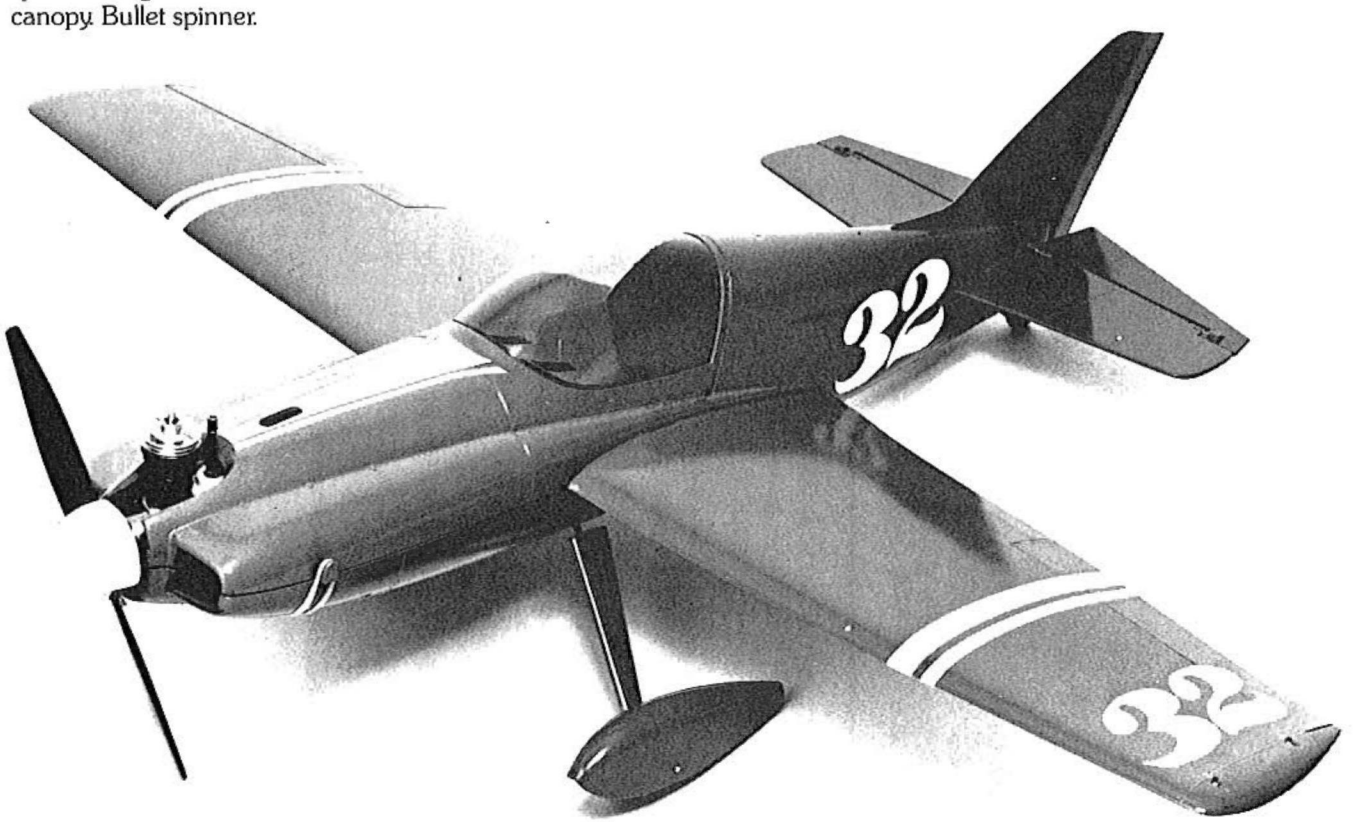

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Jr. american modeler

THE HOW-TO-DO-IT MAGAZINE FOR THE BEGINNER AND SPORT FLIER.

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jam session

The first time one of our models encountered a thermal we did not recognize it for what it was. Have you ever had one of your models in a thermal? Do you know what a thermal is? We didn't either back on that day whose date shall remain secret! A thermal, or "riser," has been described all sorts of ways—usually as a bubble of air warmer than the surrounding air which suddenly breaks loose and rises. It could be a succession of bubbles, and, in fact, does seem to be a continuous rising column of heated air topped by a puffy white cloud. The thermal revolves while it rises—like water going down a drain, only slower.

Rising air is found over dry, dusty fields; "sink" is found over cool surfaces, such as water or grass. When a competition model sinks like an elevator to the ground floor, it is said the model "hit a hole." Warm runways, tin roofs, all cause thermals in our small-scale scheme of things. The higher the thermal rises, the wider it gets, like a great funnel slanting off toward a cloud if there is a wind. Experts can tell when a thermal approaches by standing bare-chested to the breeze—it picks up faintly and, prior to the thermal itself, it seems a bit cool.

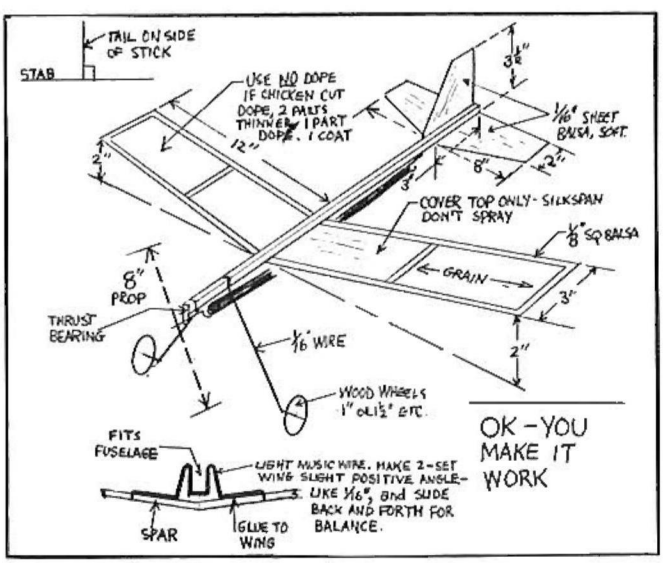
Experts have been known to do all sorts of things to spot a thermal. They have blown "soap bubbles" in a steady stream. Where the stream of bubbles encounters a thermal the bubbles climb a hill and come down on the other side—or they go up until they pop. Adept at towing gliders, a flier pulls the glider all over the place until he feels a bump on the line—then he releases the craft. Models are adjusted to circle tight and flat. When they touch the edge of a thermal, you can see the wings tip suddenly. A good design has the characteristic of nudging into the thermal.

Thermals can be awfully powerful. We've seen a "dust devil" scoop up wings from the ground. The wings vanished later high in the sky. A guy made a hand-glide test, the model stalled hopelessly. It went up in a thermal while he stood open-mouthed. Up and up, stalling and diving, then disappearing forever. (Don't forget your name and address on any free-flight model, no matter what type.) Saw an 11-pound, loaded-with-fuel duration model go out the "top." An all-balsa biplane built like a brick did the same (a Dakota if you are curious).

We've flown lightplanes throttled back—real aircraft, like a Cub—in thermals and followed the thermal into an eerie shadowy place beneath a cloud. (Don't try that today—a 747 might come out of the cloud!) After all, huge sailplanes skillfully ride the thermals, going cross country by hopping from the top of one to low down in another.

That model we had? It took four minutes and many hundreds of feet in the air to go several city blocks. We should have known better—we weren't that good! How about catching a thermal of your own? Build a stick model of about 24-inch span. Make a simple wing out of 1/8 sq. Use, say, an eight-inch prop. Stretch the rubber when you wind for lots of turns. Try it on a hot summer morning, about 11 a.m. Adjust it to circle. You need no gadgets. The prop stops—it makes no difference.

There's nothing like that first thermal. You'll feel great. It's worth losing the cheap model for the thrill. —*Bill Winter*



Letters

Mom Thinks RC Is Toy

I am saving up for an RC plane, but my mother thinks that RC planes are just expensive toys. I have told her all about how RC planes help bring out one's mechanical abilities and how a hobby can affect a person's life. She just won't agree. Please print my letter and an explanation of what flying planes is all about. I would gladly receive any replies from JAM's readers.

Mark Hagen
33 North 6th St.
Rio Vista, Calif. 94571

Here's your letter, Mark. Maybe some JAM readers can drop your Mom a note. WE think the things that you can learn in this hobby have application in many future professional endeavors.

—Editor

Kind Words

I am 14 years old. I subscribe to JAM and because I belong to AMA, I also take AMERICAN AIRCRAFT MODELER magazine. I love them both very much. Even though I fly RC I still like JAM better because it's more my speed, so to speak. I have an Ugly Stick which is my pride and joy and, thanks to JAM, I can keep it in the air. I just wanted to thank you for putting out such a good magazine that to me is not only terrific, but helpful too!

Howard Fesler
Hacienda Heights, Calif.

Can JAM Readers Help?

Where can I find a crankshaft bearing for an O&R 29? I have one but the rollers are missing. Also where can I find a prop washer for the same engine? I would be grateful.

Billy Davidson
Rt. 1
Box 119
Fort Valley, Ga. 31030

We've included Billy's full address so that readers having information he needs can write to him directly.

—Editor

Liked Gliders Nine Article

The July-August issue of JUNIOR AMERICAN MODELER looked great. The "Gliders Nine" article was particularly good. I sure hope JAM prospers and does its intended task—I know it's going well in my neighborhood. Locally, I see a new interest in both the subteens and teens. For years it seems they didn't give a darn!

George Wilson
Walpole, Mass.

Constructive Criticism

I wish to congratulate you on a fine magazine. After several months of reading it, I have come up with the following suggestions: Start a column where readers could write in and ask for pen pals, combat opponents, etc. Keep RC where it is. Fewer all-sheet models (sheet is becoming more expensive, and is hard for a beginner to work with). How about a slap-together-in-two-hours slab-winged profile CL trainer? In your articles you seem to use MonoKote an awful lot. This is OK on CL or RC, but must you use it on rubber models? What about good-ole Jap tissue? How about a built-up wing-stick fuse-ROG/ROW? (Or any simple ROW?) How about some helicopters and autogyros? Keep up the strange and unique models. Do you accept project articles from readers? All in all, a great magazine. Make it monthly.

Paul Cowan
Pittsfield, Mass.

Thanks for the helpful suggestions, Paul. We are always pleased to receive well-written articles.

—Editor

Color Scale Views Needed

I am building a model of the Spirit of St. Louis, a kit made by Sterling. To make it look authentic, I'd like to have a three-view of it showing the colors and design. Could you supply me with one?

Kevin Gross
Chicago, Ill.

Sorry we don't have one, but you may want to try the Smithsonian Institution in Washington, D.C.

—Editor

Paper Airplane Fan

I am sure that by now you have heard of the Kline paper airplane. I am writing in the sincere hope that you will do an article on the airfoil and how to make the plane in JAM soon. I make and sell paper airplanes during the school months and I can assure you that the art of making a good paper plane is not dying. Two years ago business got so productive I even bought a rubber stamp to mark my aircraft with. I have found two designs that fly well, one having an airfoil similar to the Kline aircraft and one that looks a lot like the Bishop's Hat featured in a past issue, but flies considerably better. I have built "Flypaper" and it flies very well. I hope you continue your interest in paper aircraft as in the past and produce an article on the Kline plane.

Dave Roberson
Glen Burnie, Md.

P.S. How about an article or two on Peanut planes?

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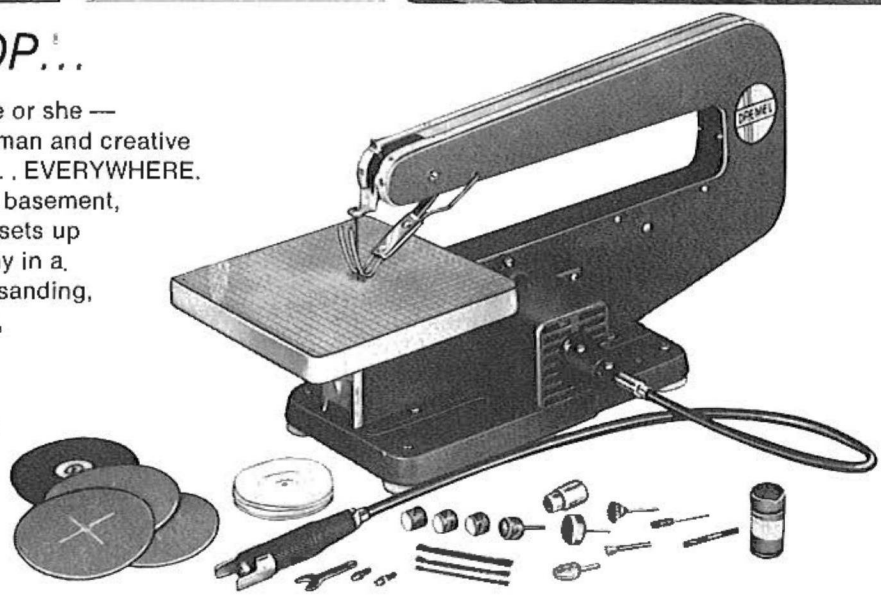

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What's Your Question?

BOB RUDY

Q: In the 1971 Hobby People Catalog there was an article on how to change a Cox 049-powered dune buggy into an RC car. Could you please send me that article. If you cannot get the article, could you please tell me how I *can* change an 049 Cox dune buggy into an RC car?

John Franchi
Bridgeport, Conn.

A: I have forwarded your letter to Hobby People. I don't know if they have any old catalogs in stock, but they may be able to help you.

Q: I'm back and I've gone aqua! I have two large projects in mind with which I am going to need considerable help. First, a Powerhouse on floats. (See p. 44 Mar.-Apr. '73 JAM.) Is there such a thing as a Powerhouse kit? If not, where can I get plans? Are Forster 99s still available, or must I use a different engine? About how much do these engines cost? Where can I get the floats? Could I use MonoKote on the wings? Is this model very difficult? Tell Sal Taibi I think he designed a great plane.

Next, a radio-controlled hydroplane. (See pp. 14-15 in July-Aug. '73 JAM.) Does this boat come in a kit? Are there plans? Or is it a homemade job? If there are plans or a kit, where can I send for them? I think it would be best in fiberglass with a good two-channel RC system. Where can I get a good two-channel RC system (throttle and rudder), including relays and escapements? I would like it to be inexpensive (pulse). Where can I get stuffing boxes, rudders, propellers, flywheel/starter-cord pulley, engines, V-struts, engine bearers, drive shafts, and water-cooling system? Should I use about a 19 in this? Or larger?

I read in your July-Aug. '73 JAM about how using two kinds of paint together can smear up your model. Is it okay to use Testor's plastic model paint and Aero Gloss dope together on a Li'l Wizard? Would the Testor's not run if I sprayed a coat of dope over it? Anyway, *muchas gracias* for the info, and... Whoops! Almost forgot! How do you get into the AMA?

Scott Peterle
Delaware, Ohio

A: Wow! Lets see how much help I can be. Plans for the Powerhouse are available from "old timer" John Pond, 4135 Avati Dr., San Diego, Calif. 92117. The Powerhouse plans date from 1939 and cost $2.75. Ask for Plan No. 3E7. Note that the wingspan is 84 in. If you want John Pond's complete listing of old-time free flight gassies and rubber-powered model plans, send 50 cents to partially offset the cost of mailing and handling. Blue line copies of originals are provided, with most of the plans showing ribs and formers. Service is prompt.

Powerhouse kits, to my knowledge, are no longer available except for expensive antiques. Forster 99s are no longer manufactured. Perhaps someone has an antique that you can buy, but these are expensive. For fun flying use a 35 to 45 glow engine with a timer. I can't help on finding floats for this model. MonoKote is an excellent covering material for the entire model.

If you are just starting in radio-controlled hydroplanes I suggest that you send 25 cents to Dumas Products, Inc., 790 South Park Ave., Tucson, Ariz. 85719 for a complete product catalog. I know of ten hydro models that they produce from $6.95 and up. This would be a good way to start. Each kit will specify the size of the engine required. As an RC unit I would recommend any of the 2- or 3-channel proportional models now on the market. Try the Hobby Shack Cirrus 2 at $69.99 as the lowest price two-channel set on the market.

It is *not* okay to use Testor's plastic model paint and Aero Gloss dope together on the Li'l Wizard by Goldberg Models. For each model use only one brand of dope.

As for getting into the AMA, send a note to the Academy of Model Aeronautics, 806 Fifteenth Street, N.W., Washington, D.C. 20005. They will send you a free brochure and an application blank.

Q: I am fairly new to modeling, but I am fairly informed on the basics of control line, free flight and RC and I would like to teach younger kids in the 9-13 age group. I would like any suggestions on what to begin to teach and what approach to take. Also can you please tell me the difference between a throttled and an RC engine? Could you explain Control Line, Carrier, Speed, and Proto Speed. Lastly, could you please tell me the difference between digital and proportional RC?

Kevin Mooers
Swampscott, Mass.

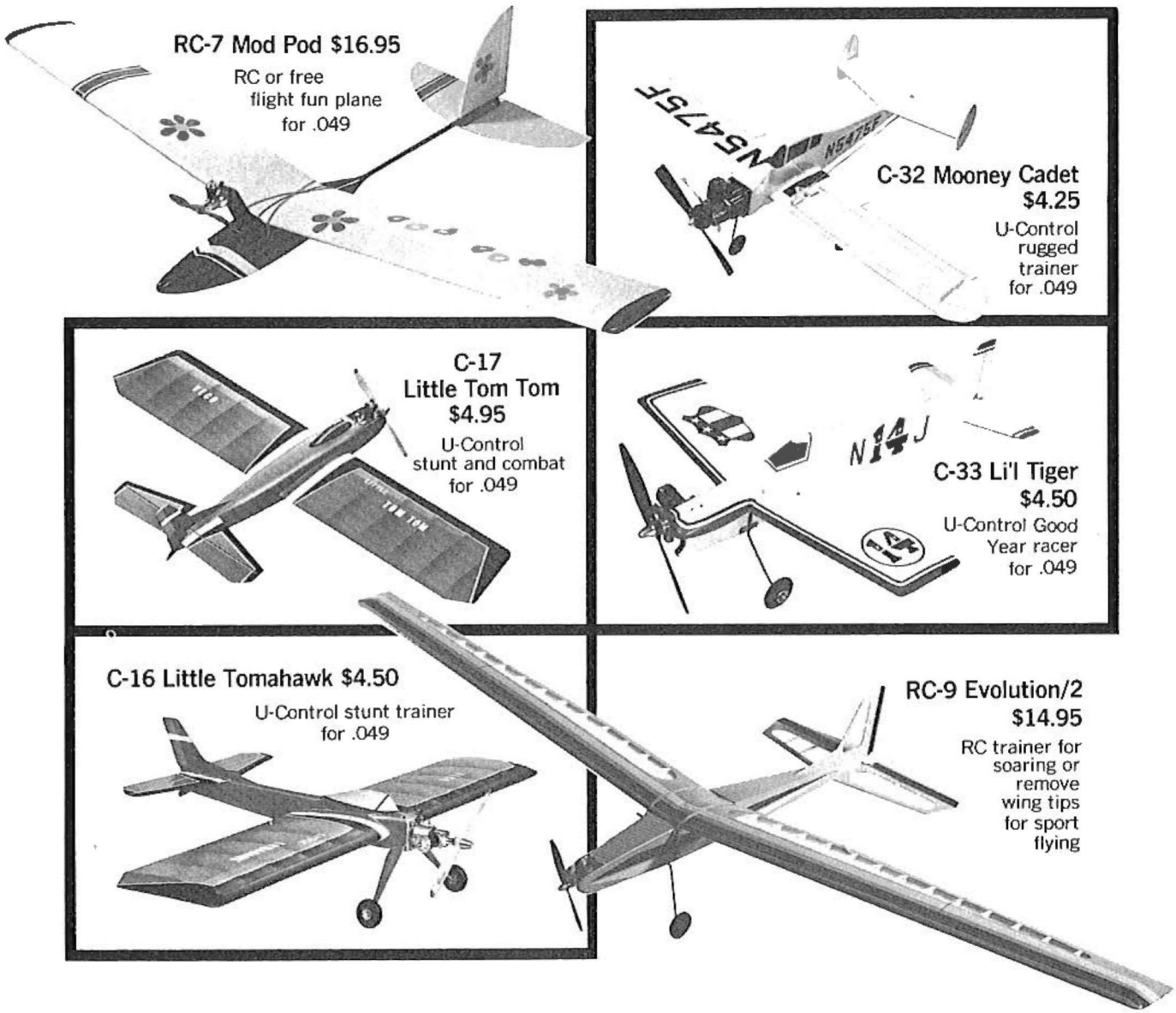
A: Your first question is most difficult to answer. I have found that the area of modeling, i.e., control line, free flight, or radio control, is not important. What is important is that young modelers start simple with well-designed kits so that initial experiences are successful. When I first started flying gas-powered free flights in the late 1940s as an 11-year-old, I was lucky that my first model flew perfectly. Later models did not do as well, but because of this initial success I did not lose interest. For control line there are two excellent items to consult. Larry Renger has written "Getting Started In Aerobatics" in the July 1973 issue of American Aircraft Modeler. Also, Dick Mathis's *Learning to Fly U-Control* is super. This is available from Sig Mfg. Co. for $1.00.

There is no difference between a throttled and an RC engine. These are two terms for the same thing. Also there is no difference between digital and proportional RC. Proportional refers to the fact that the controls on the model move the same relative amount as does the control stick on the transmitter. Digital refers to the internal electronic workings of the RC unit.

Control-line Speed is an event in which the goal is to go as fast as possible. Timing starts after speed has been built up, and most models have a drop-away landing gear. Models are highly specialized in design, and do not look too much like full-scale airplanes. Proto

(Continued on page 54)

EASY TO BUILD
EASY TO FLY... AND DUMAS MAKES 'EM EASY TO BUY



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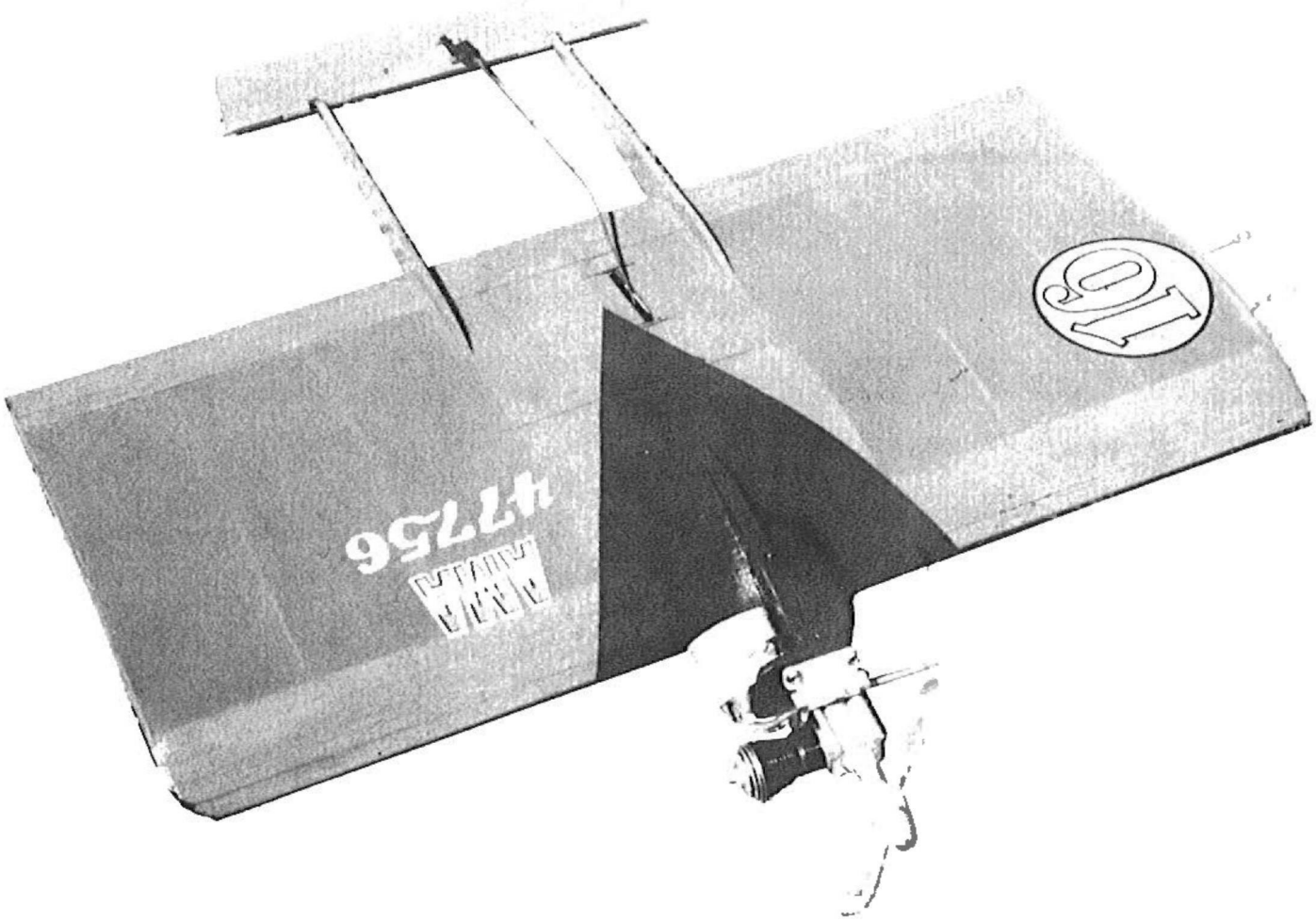
FEARLESS



FLY

THIS MANEUVERABLE STUNT AND COMBAT MODEL FOR THE COX 049 WAS DESIGNED AND BUILT BY A JUNIOR. / by Mitchell Blum

The Fearless Fly can be built in one day if you have made a few flying models before. It is inexpensive, using a minimum of materials. It is best to use new, lightweight balsa; but if you can build it mostly from material left over from one of Dad's big kits, you will need to buy a minimum of new materials.

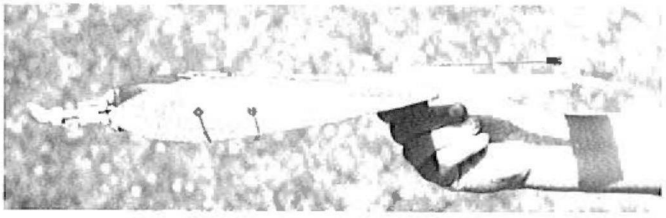
The Fearless Fly can be used as trainer if the amount of elevator movement is limited. This restriction can be removed later, after you have gained confidence. The model will give you hours of fun in learning maneuvers or flying combat with fellow modelers.

Construction: The ribs are all the same, with the exception of rib numbers four and five. The rib pattern is obtained from the profile view of the plan. All ribs are cut full-size including the 1/16" deep notches for the leading and trailing edge planking. Note that tip ribs are 1/8" thick, while all others are 1/16" thick. This double thickness at the tips will reinforce the wing, and the thick rib will not bend when the covering material dries. Select two of the 1/16" ribs as ribs four and five. Remove an additional 1/16" wide strip from the top and bottom of these ribs so that the ribs match the dotted lines when laid on the profile view. This will permit the 1/16" center planking to align with the airfoil, and match the leading and trailing edge planking when assembled.

Next, cut the 1/4" square leading edge to length, also the 1/16" sheet for the leading and trailing edges. Lay these pieces on the plan and, with pencil, mark the exact rib locations. The main section of the wing can now be glued together. Pin one of the 1/16" trailing edge pieces over the plan on a flat working surface. Use wax paper to prevent sticking to the plans. Pin all ribs in place on the trailing edge. Position the leading edge on the ribs, pinning them at each position. Now glue all of the joints.

While this section is drying, the stabilizer and booms can be cut and sanded. Note that the stabilizer must be notched to accept the extreme end of the booms and that a 1/16" hole must be drilled in the end of the booms to allow for the 1/16" diameter wire hinges. Now to assemble the booms and

Mitchell Blum ready to launch Fearless Fly, its 049 engine peaked out and then backed off slightly to allow for leaning out at high speed.



Profile view shows the sleek lines. Note how the leadouts exit through eyelets in the extra-thick wing tip rib. Perhaps you can see pushrod.

stab. Drill 1/16" diameter holes and recess the edge of the stab to accept the wire hinges. Place glue in the holes and recesses of the stab. Insert the wire hinges through the holes in the stab. When this assembly is dry, cover around the leading edge of the stab at the wire hinges with Silkspan for reinforcement.

By now the glue should have dried on the wing and that work can be resumed. Remove all of the pins and the wing from the plan. Place glue on the ribs and install the top 1/16" trailing edge; also glue the trailing edge planking together at the mating joint along the entire length of the wing. Next add the 1/16" leading edge planking, top and bottom, gluing at each rib.

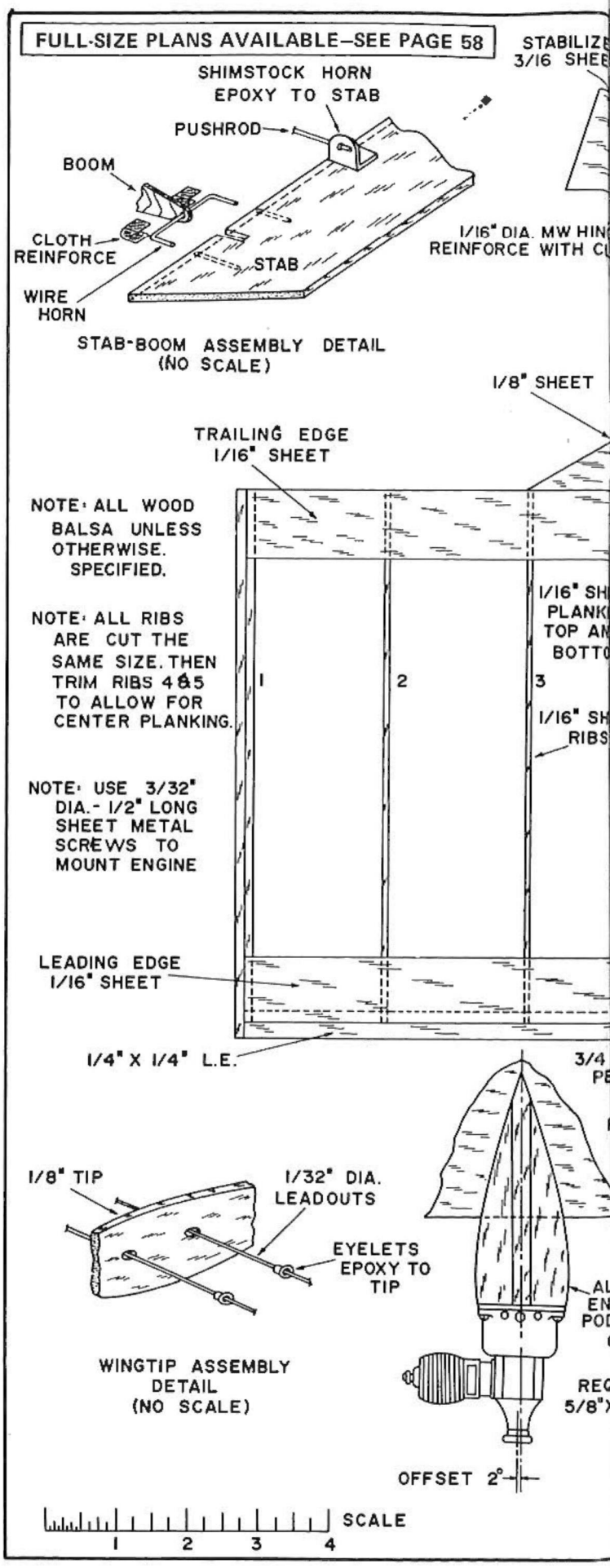
Next cut the 3/32" plywood bellcrank mount, drill the hole for the bellcrank bolt, and glue the mount into the wing. Cut the 1/32" diameter wire leadouts to length and install on the bellcrank. Place the wing over the plan and mark the position of the leadout wire holes on each rib. These can be cut now using a balsa knife with a pointed blade.

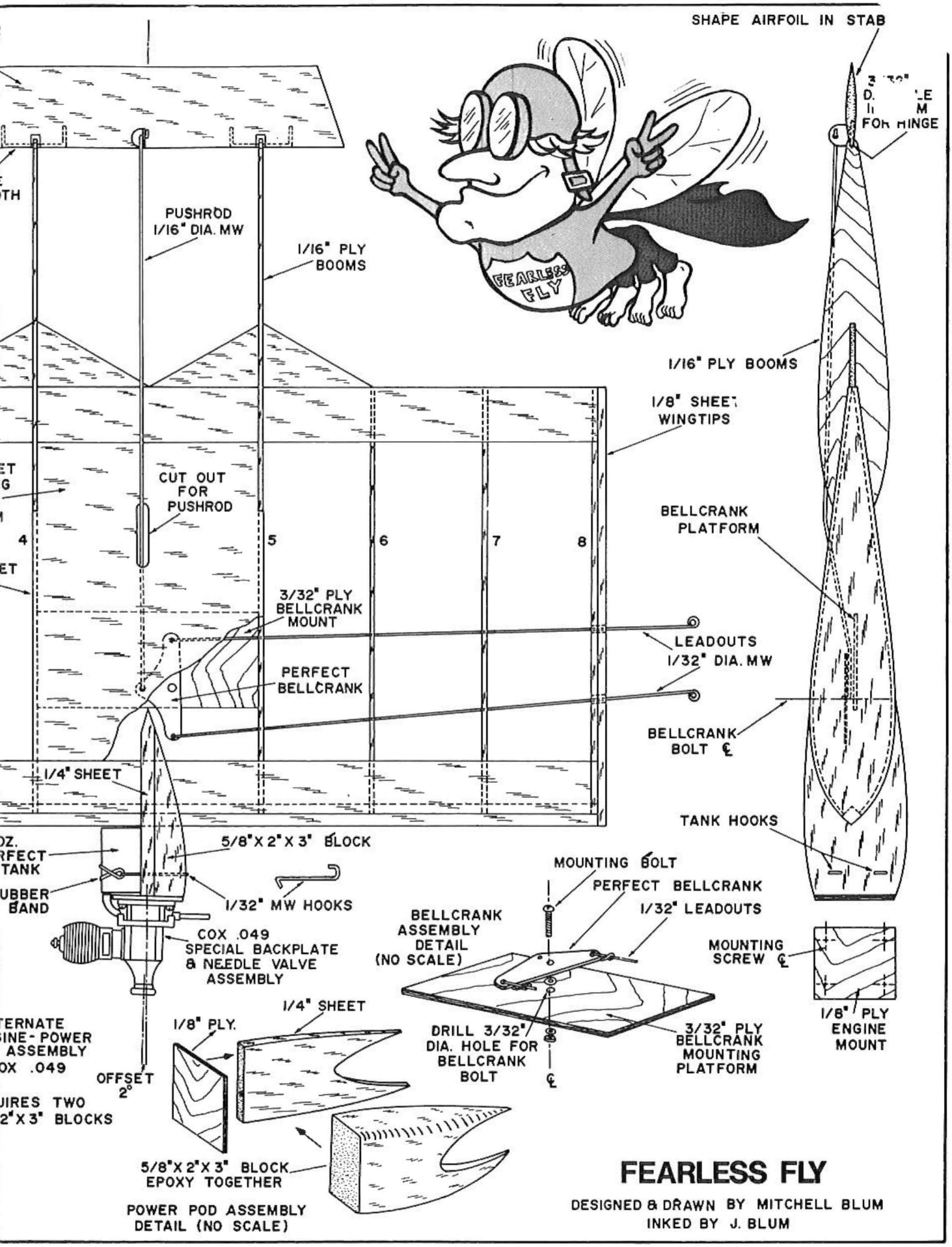
While the glue on the bellcrank mount is drying, several other jobs can be performed. Install the control horn near the center of the stab at its leading edge. This horn can be made from metal sheet or purchase a small horn which bolts onto the stab.

The plan calls for a Cox 049 engine which utilizes a separate fuel tank. If you are using a Golden Bee or similar engine with attached tank, the engine pod must be shortened 1/2". The pod can be cut from 1/4" sheet balsa and glued to a block of soft balsa that can be rounded to form a smooth, rounded pod. The square 1/8" plywood engine mount is glued to the pod. For strength, the entire pod can be covered with Silkspan after assembly to the wing. While these parts dry, the wing can be completed.

Bend the 1/16" diameter pushrod to length except for the bend at the stab. Next install the bellcrank, with the leads and pushrod into the wing. Cover the top and bottom of the wing with 1/16" balsa planking. Be sure to cut the slot for the exit of the pushrod. This is best accomplished by having the planking joint fall somewhere near the center of the slot and cutting part of the slot in each piece of planking.

(Continued on page 57)





FEARLESS FLY

DESIGNED & DRAWN BY MITCHELL BLUM
INKED BY J. BLUM

THE DO'S AND DON'TS OF EPOXY

Afraid to try epoxy?
It has many advantages—including great strength.
So here's a rundown of what you
need to know. / by Jim Kloth

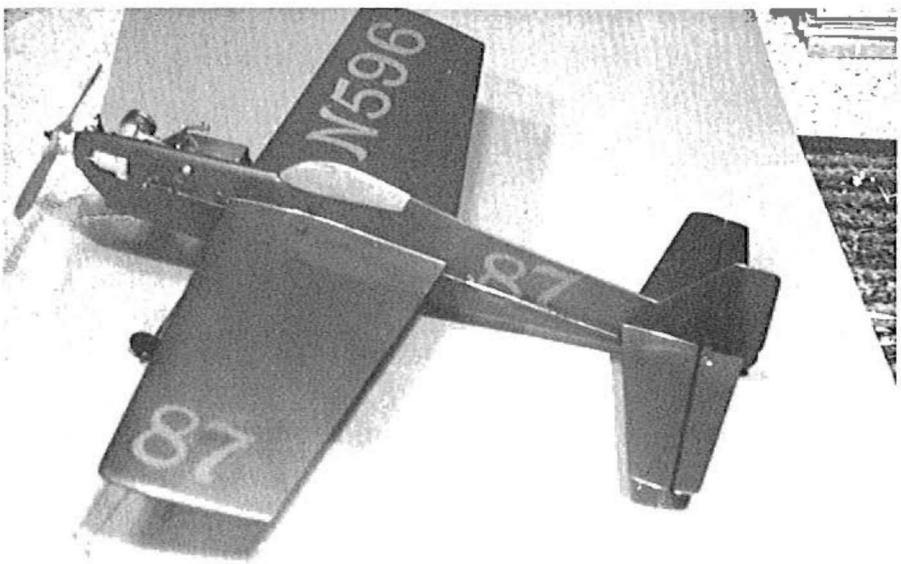
There must be a gillion different kinds, types and brands. Anyone, other than a plastics expert, who tried to sort all of them out would become a candidate for the funny farm. They can be blended, mixed, or batched to do all sorts of wondrous things—provided you know what you are doing.

They can wind up hard or soft, flexible or brittle, weak or strong, or almost any combination of all of these things. The method and conditions of curing or hardening are just as important as how the basic ingredients are proportioned. I learned a little about them in my job and tried to use them with my models too. Did I ever learn the hard way! Epoxies can be a wonder, but they can also be a horrible nightmare. So this is written with the hope that other model builders can profit from my mistakes, to enjoy the benefits and avoid the failures.

Epoxy is a material which allows the modeler to do many things not possible with regular model airplane glues. It is very strong, light and fuelproof, perfect to use around the engines of model airplanes. Only a little dab is needed in most cases to make a good joint, often stronger than the parts which it is holding together. It is probably the best thing to happen to the model builder since the discovery of balsa wood. But there are several things to keep in mind when using it.

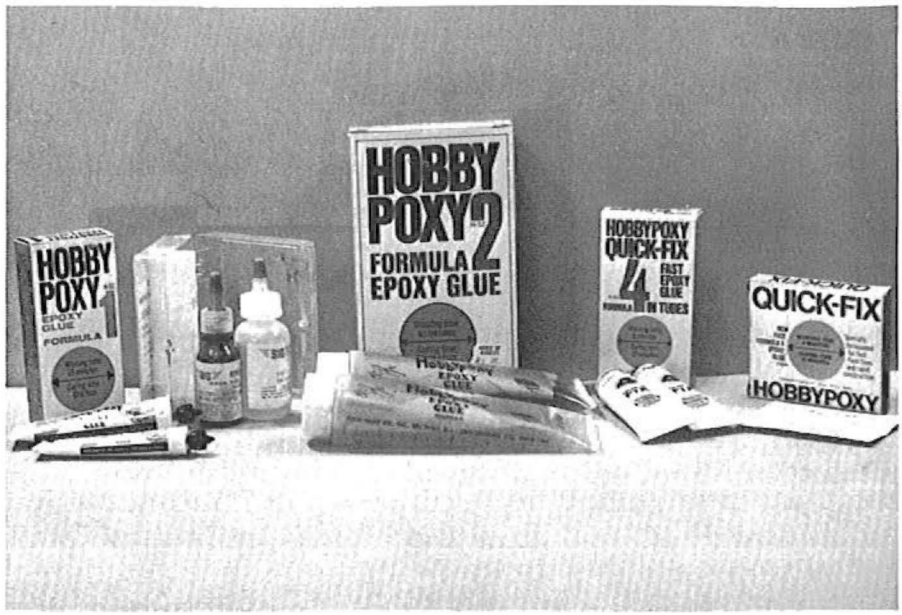
Epoxy cures, or hardens, by chemical reaction. The other types of glue which the model builder uses harden when a solvent or thinner evoporates. Joints made with these glues can be softened again if they are soaked with more of the solvent. Virtually nothing will soften an epoxy joint once it has hardened.

Some of the glass cloths on the market. So-called lightweight cloth from marine houses is heavyweight in the modeling field. Superlite is like silk. Easy-Does-It is not glass fiber, so no itching from sanded particles.



Author's Rossi 15-powered Owl Goodyear Racer with repairable epoxy finish described in article. Photo taken after a mid-air and repair.

Materials for Easy-Does-It finish: Alcohol, paper toweling for cleanup. Hobbypoxy glue knife, left front, has just the right edges and thickness. Artist's pallet knife, behind brush, has crooked blade for tight spots.



Note that equal-sized tubes are for those brands of epoxy which are blended from two equal parts. Formula I and Sig are two-to-one mixtures. Epoxy does not evaporate from joints.

Adhesives and materials for building: left to right, Formula I, one of several sizes by Sig, toothpick applicators and plate for mixing, Formula 4 which must be measured, and Formula 4 in premeasured packets for field use.

The finishing touch: Stuff, left, is great. Filler, right, harder to use, directions important; Sig Epoxolite ideal for dents, fillets. Shape with moist finger while still soft—won't shrink and crack.

Ready for painting? Binks Wen No. 2 airbrush, the all-important Tack Rag, paint jars or cups for different size jobs, thinner, and an inexpensive respirator to protect lungs when spraying—especially in a closed area.

Two different parts of the epoxy are mixed together to start the chemical reaction. The mixture gets warm and the epoxy starts to harden. The warmer it gets, the faster it hardens. You won't feel this heat in the small quantities which we use but larger amounts can generate enough heat to burn the fingers. Since no solvent evaporates while it hardens, epoxy does not shrink. The other types of glue shrink as their solvent evaporates, putting stresses and strains on what you are gluing together. This is where the warps come from that twist your wings and tails. It takes quite a while for all this solvent to evaporate, often weeks. The warps often do not show up until later, after you thought that the model was all trimmed out and flying well. This is why I build everything with epoxy. Remember though, because it cannot be softened again, it is very difficult to remove from places and things where you didn't want it.

The most important thing to remember when using epoxy is that it must be measured and mixed carefully according to the directions for the type, kind, or brand which you are using. An improperly measured batch will never harden. It usually stays a gooey mess and is very hard to remove if you try to use it. Some of it always seems to remain behind which keeps a later, properly blended batch from getting to the parts to be joined. It will also affect the later batch and keep it from hardening properly.

Poor mixing of the two parts gives the same result. Insufficient stirring doesn't blend the two parts together uniformly. They will not harden. Stir them until you think the mixture is about right and then stir some more. Both parts are quite thick, about like honey, when you measure them out. Stir them together and they become quite thin and runny. This is one way to tell if you have stirred them enough. Stir them a little bit more and then get busy with your gluing.

The chemical reaction starts as soon as the two parts are mixed together. This curing also accelerates, speeds up. The harder it gets, the quicker it gets harder. Also, the larger the batch, the more heat generated—and the heat makes it get harder quicker. This is why it is always best to mix epoxy in several small batches rather than one big one. A large one will be much too hard to use before you can use it all. Another reason for mixing small batches is that the runnier batch will penetrate pores of the wood deeper to make a better and stronger joint. Obviously, it is advisable to get all your pieces ready to glue before mixing the two parts. Plan your work so that the pieces can be assembled quickly, before the glue gets too thick.

Do not mix new batches of glue in the same cup or over the remains of an earlier batch. The two will react together and cause the new one to harden much quicker. Tail ends of batches which are still slightly soft, but too hard for a good

(Continued on page 56)

Mix epoxy, Parts A and B, according to instructions, and mix only enough for job on hand. Epoxy dries by chemical action. Apply properly—it won't come off when dry.

U-Control your race car

RADIO CONTROL TOO EXPENSIVE? FREE-RUNNING TOO BORING? HERE'S A WAY TO RACE WITH THROTTLE AND BRAKE RESPONSIVE TO YOUR 'TOUCH.' / by George Siposs

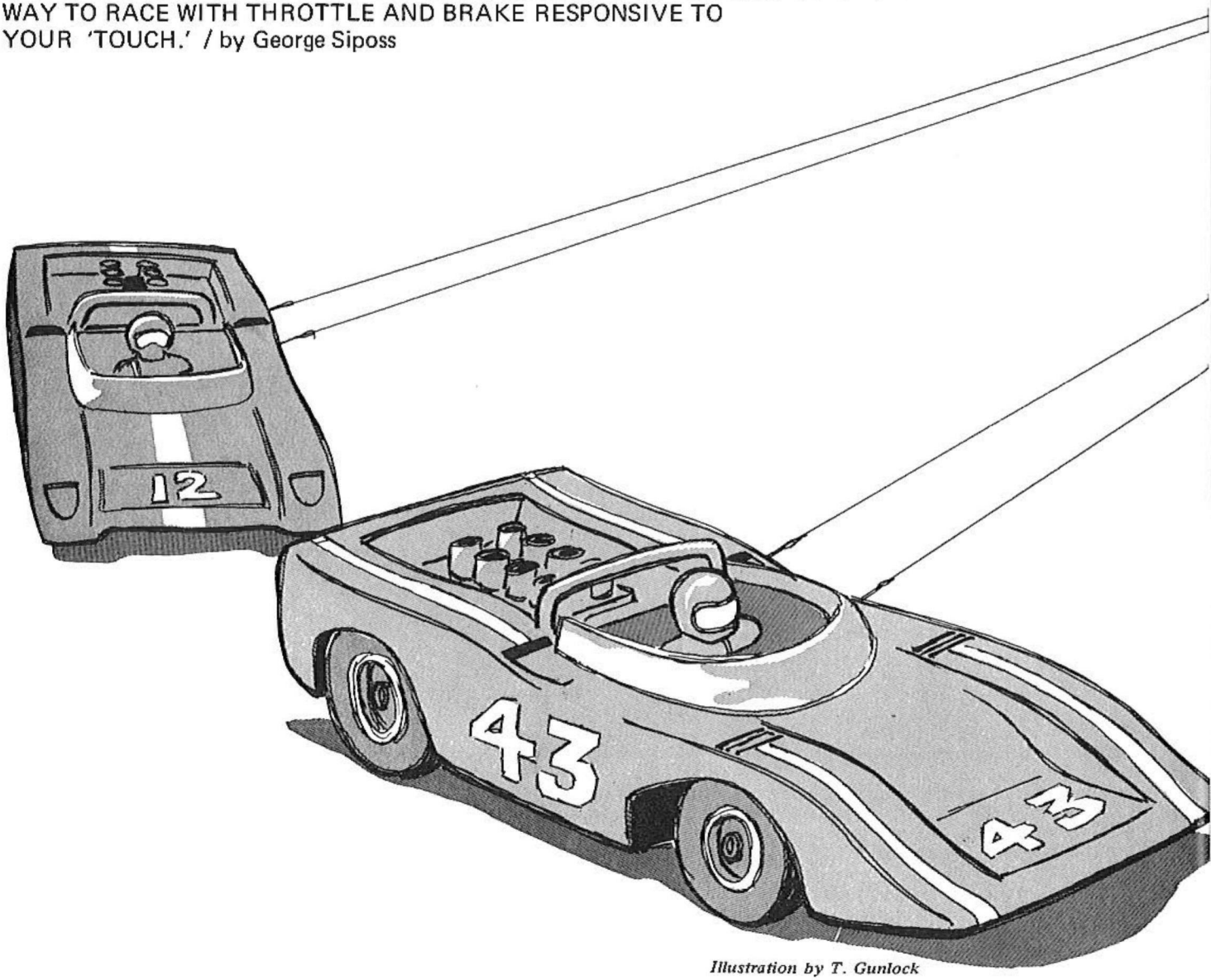
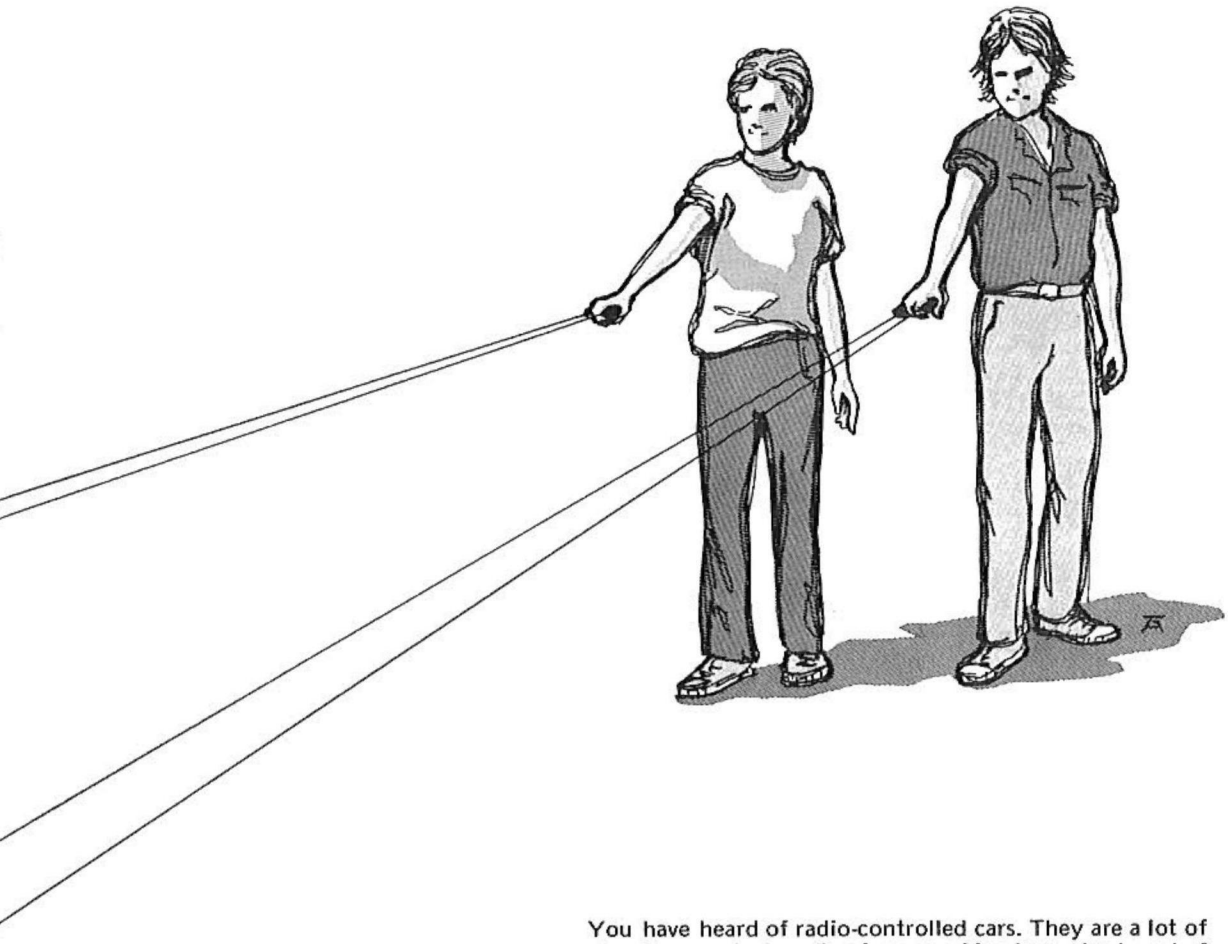


Illustration by T. Gunlock



You have heard of radio-controlled cars. They are a lot of fun but they cost a bundle of money. You have also heard of engine-powered model cars, which run free on any paved parking lot and the "driver" has no control over the car's movements.

Somewhere between these two extremes there is a compromise. There is a way to make your engine-powered car run under quite a bit of control. U-control is the answer!

U-control cars are somewhat similar to U-control model airplanes. The car is connected to the driver's handle by two thin wires which also connect to the throttle and the brake in the car. This concept was originally developed by a Southern California hobbyist, Farrel Papic, who has several cars running by this method. Here's how you can achieve the same effect.

The most ideal cars for U-control are built to 1/12 scale. A Jerobee car, for instance. There are other models built to 1/12 scale—the Bentley by Model Products Corporation, the Diamond Duster by Lindberg, Porsche by MRC-Tamiya, Camaro by Testors, and many others. These cars either have a motorized chassis or, if only a body shell, you have to make the chassis yourself.

If you have a car with an engine in it, all you have to do is install a T-shaped bellcrank in the car—much like a U-control plane. Make sure that the pivot of the bellcrank is exactly over the center of gravity of the chassis so that your car will be able to run in a circle without tugging at the wires or slackening them up constantly. Any hobby shop which sells model airplane supplies will be able to help you out with parts and help in installing a bellcrank.

Top: When you attach the wires to the bellcrank make sure there is enough room for the wires to pass through the body. Above: They're ready to race!

If the engine in the car does not have a throttle, then all you really need is a single wire leading to your hand. There should be a V-shaped wire attached to the car to which your single wire is attached. With this arrangement you simply have a friend fire up your car while you stand in the middle of an imaginary circle—the car runs around you. You do not have control over its speed, to be sure, but there are a number of maneuvers you can perform, so that the car runs wide or inside the imaginary circle.

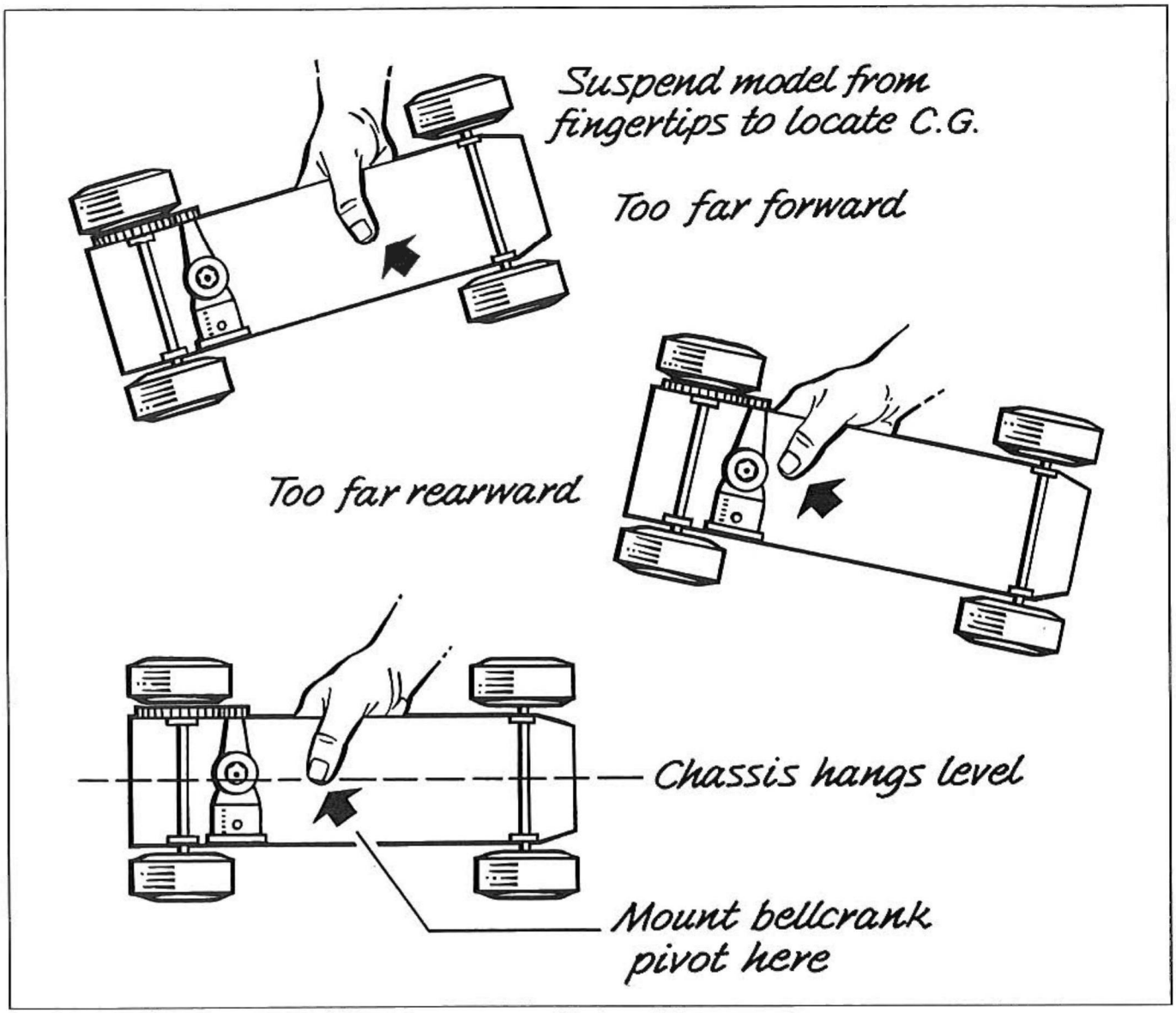
When there are two similar cars racing, the other driver stands right next to you. The cars are started at opposite sides of the circle. At a given command the cars are released and the race is on. By skillful manipulation you can actually gain ground over your opponent and even pass him! He must duck his head to let you pass your wires over him. With a little bit of experimentation you can stage very exciting races.

If your car has a clutch and throttle in it (such as a Jerobee car without a radio in it), you install your bellcrank exactly as described above. Just make sure that the pivot point of the bellcrank is at the center of gravity of the car. You can find the center of gravity by holding the chassis between your thumb and first finger. If the chassis stays horizontal you have found the CG. Mount the bellcrank with its pivot on the side of the chassis nearest to you. (Fig. 1.)

You can go fancy and make a simple brake as well by installing a wire or plastic band over the clutch bell; this is connected so that, when the throttle is off, the brakes are on, and vice versa. With a little bit of thought you can plan this out. The worst that can happen is that the brake will be on when the throttle is on; in this case just reverse the connections. It is best to connect the guide wires to the bellcrank in such a manner that, when you pull on the wire nearest to the front of the car, the throttle will go on, and when you pull on the rear wire, the brake will go on.

All this is well, but what do you do if you do not have a car with a clutch in it? The answer is simple. Build the car yourself.

The pictures accompanying this article illustrate a car made by Mr. Papic. Actually it is more elaborate than you



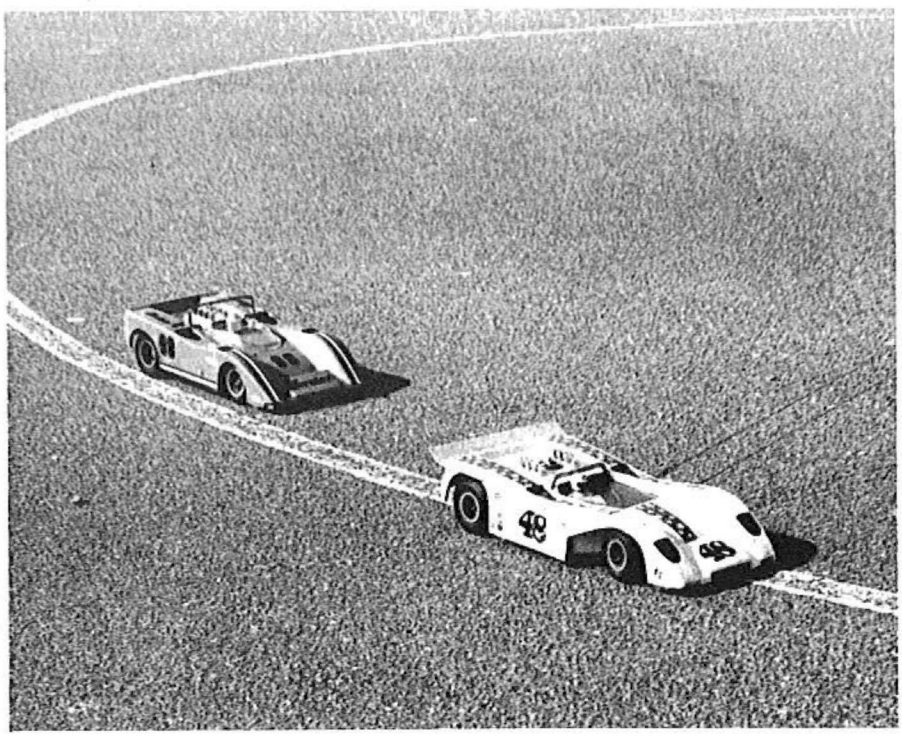
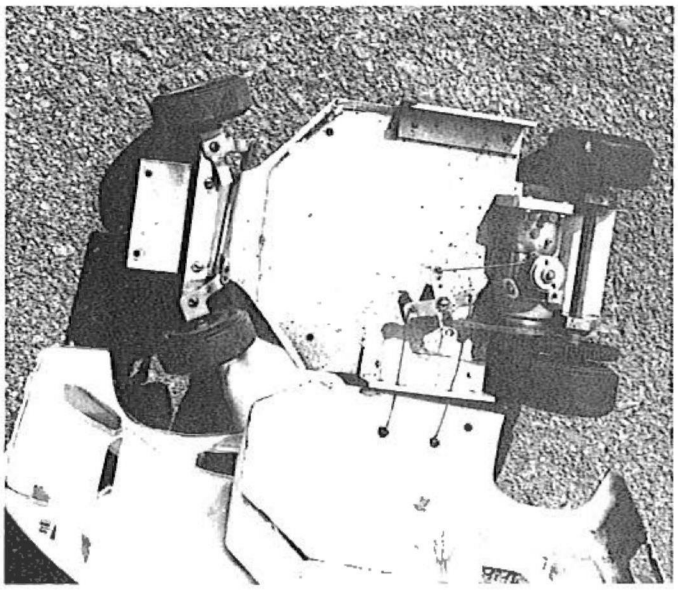
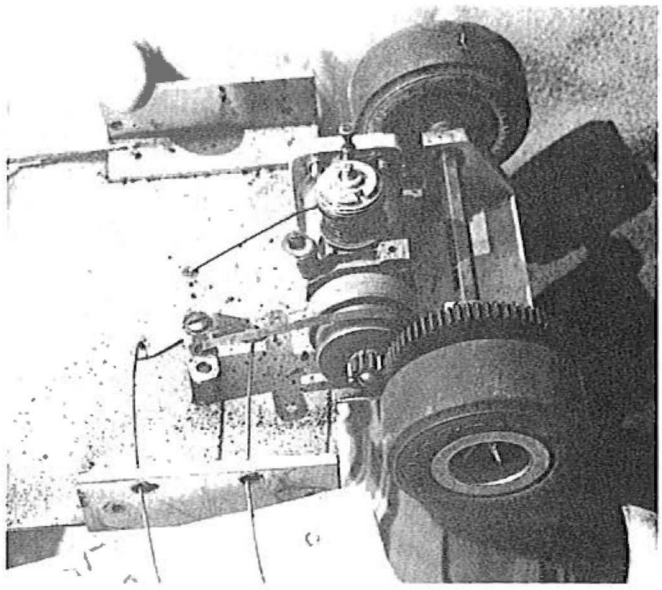
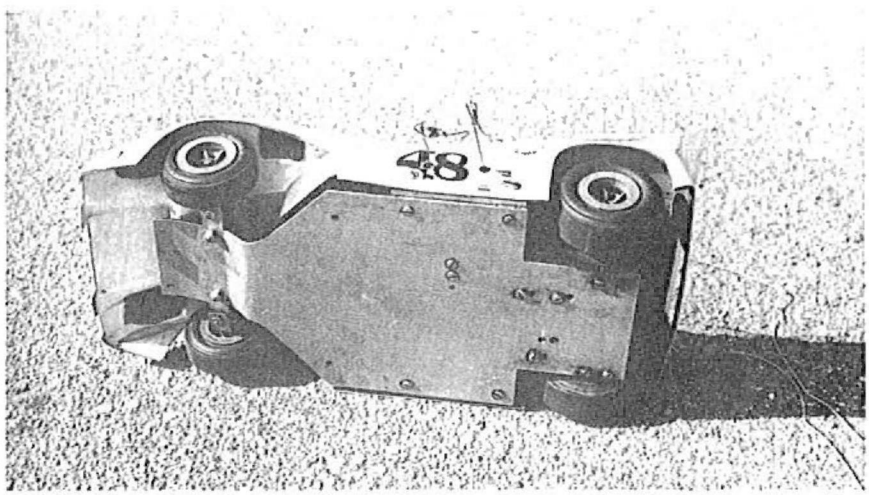


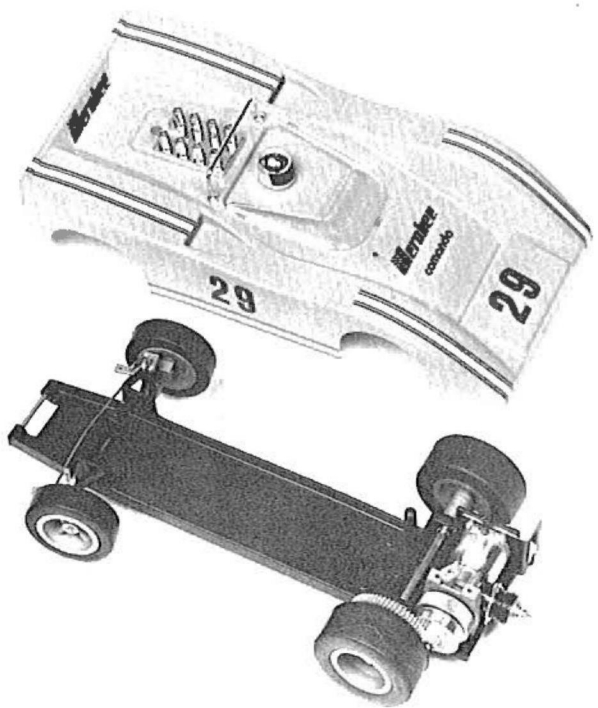
Figure 1. For good running, car should balance properly. The center of gravity must be properly located—that is where bellcrank installs.





Above: Overall view of the Papic car with the body removed. Note that the chassis is handmade from aluminum. Bellcrank installation and hookup shows clearly as does the front-end steering mechanism. Above right: Engine is mounted upright so the throttle can be actuated easily. A cross-shaped bellcrank was made by hand so that the brake (near the camera) can be used. Right: This is what the bottom of the chassis looks like. Cox wheels, tires were used. Note how leadouts exit through the body side—idea is exactly the same as the arrangement for plane handle. Below: A more expensive but first-class way to go: The Jerobee car Part No. K 30016-101 is easy to convert to U-control although the horizontal engine makes throttle linkages cumbersome. ($34.95.)





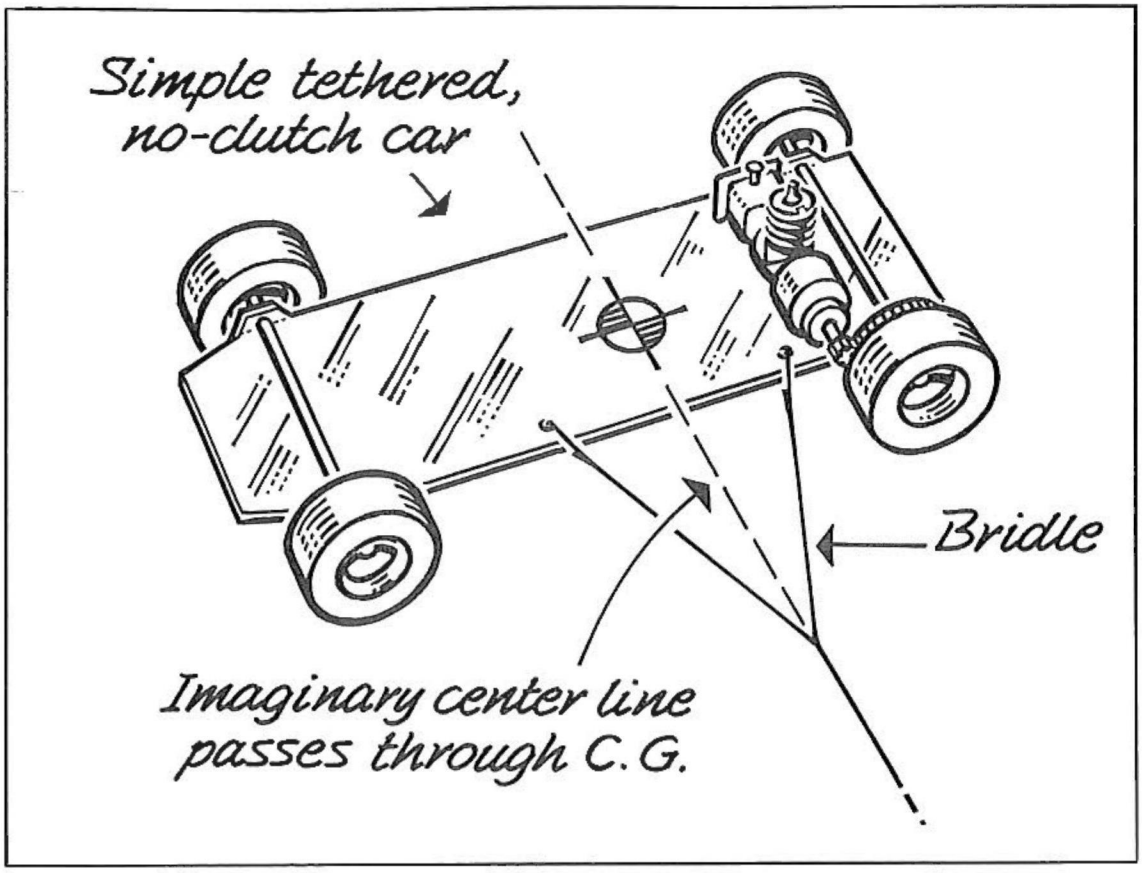
need to have it. Steering is not required so the front end can be a straight axle just like the rear axle. Make the chassis out of aluminum, sheet metal or laminated phenolic (1/8" thick). Do not use plywood unless you can seal it and insure that it will not splinter. Make some very simple brackets to hold the front axle in place. The front wheels should point straight forward because your control wires make the car go in a circle.

The rear axle should be mounted very securely because there will be sideways pressure generated against it by the driving gear on the engine. For an engine you should use a Jerobee engine with a clutch. Mount a large gear on the rear axle and then install the engine so that its gear will be in proper mesh with the large gear. Pay attention to the rotation of the engine, to prevent the car from running backwards. The large gear should always be on the left side of the car when viewed from above. Two aluminum brackets with brass bushings in them will serve as mounts for the rear axle. Now install the engine carefully and make sure that it will be secure even when you use the pullcord to start it.

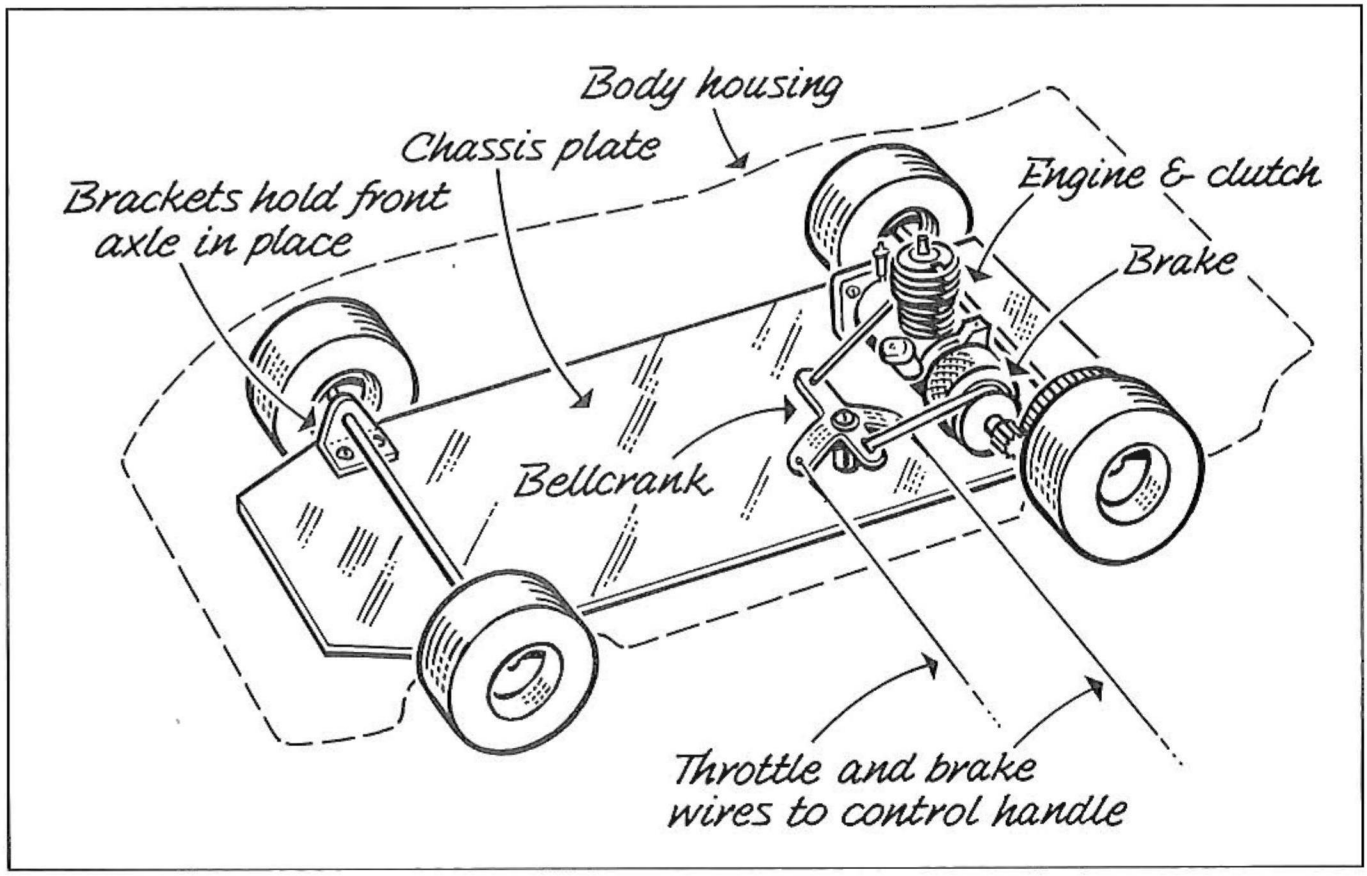
The body is mounted on the chassis by brackets or hinges. Make sure that the leadout wires from the bellcrank have a large enough hole to go through.

Choose a nice day for your first trials. Get a friend of yours to help you start the engine and to check out the linkages. Have him hold the car while you walk to the center of the circle and pick up the U-control handle. Pull on the appropriate wire and your car will start up. Pull on the other wire and it should slow down or stop.

(Continued on page 56)



Figures 1, 2 and 3 by H. A. Thomas



Top: Figure 2. How the bridle is attached to a simple, tethered no-clutch car. Imaginary centerline of control line passes through CG location. Above: Figure 3. For the car with throttle and clutch, this bellcrank allows control of both via two control lines running to handle in your hand.

A POSTAL GALLERY OF AIRPLANE MODELS

THE UNITED STATES HAS NOT HAD A MODEL AIRPLANE STAMP—BUT AT LEAST 20 OTHER COUNTRIES HAVE. / by M.W. Martin

Very few model plane builders know about the "postal airplane models," and even those who are stamp collectors and have seen those stamps, don't know much about them because there are very few of them. Out of some 140,000 stamps issued around the world during the last 130 years, probably not more than 30 show model airplanes.

The United States Post Office has never issued a stamp depicting a model airplane, but at least twenty foreign countries have issued such stamps. Some of the designs show gliders, but most of them are powered airplanes. A fairly large selection of these "paper" models is shown in the accompanying photos. The photos are fairly sharp and should be enough to go on in building a real model to copy them, but for those who want to get the stamps themselves, catalog numbers are provided with the descriptions. These numbers are from Scott's Standard Postage Stamp Catalog. (Mandatory notice required by catalog copyright holder, rigidly enforced.) Your local stamp dealer (see your telephone book's "yellow pages") will have the stamps.

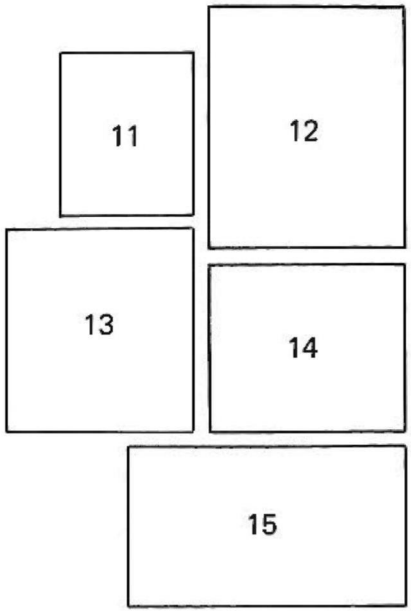
One of the first sets of stamps picturing models was a four-stamper from Croatia, issued in 1942. They were issued for a society called the Croatian Wings. Since models on stamps are not identified, dates of issue and other available information are important for those who might want to chase down the actual planes shown with these models. The

1 2 3 4

An early four-stamper set issued in Croatia in 1942 during WWII. (1) A twin-float seaplane; (2), (3) and (4) Variations on a glider theme.

5 6 7 8 9 10

(5) Hungary leads in modeling stamps. This one, issued in 1941, shows a Hungarian boy scout with artist's conception of a glider. (6) Hungarian stamp, issued in 1961, commemorates Hungarian Children's Day. As in other Iron Curtain countries, modeling was a state affair. (7) This airmail stamp of 1954 was one of two large Hungarian spectaculars. Artwork and details are of excellent quality. (8) The other Hungarian spectacular, issued in 1954, shows a glider under construction. Until recently, engines were not widely available in East Europe. (9) Soviet stamp released in 1969 features a unique glider. Do you suppose that launching method makes sense? (10) An excellent replica of a gas model of the day (1958)—as built in Russia anyway. Modeling was organized.



(11) A Netherlands stamp introduced in 1954 shows a boy launching a chuck glider—or is it a small towline model? Line doesn't show. **(12)** Brazilian stamp released in 1951 depicts contest activity. Shadowy figure in background is probably Santos-Dumont. **(13)** Yugoslavian issue of 1950 nearly puts the glider and its launcher into the clouds—one can almost hear the thunderclaps. **(14)** Air modeling is now world wide, as this stamp issued by the People's Republic of China suggests. It appeared in 1958 to promote sport aviation. **(15)** East German commemorative issued in 1961 for the Young Pioneers' meeting at Erfurt. The Young Pioneers was highly organized in the Soviet Union for many years.

4K value of the Croatian set (Scott No. B10) shows a model seaplane—it's the only stamp with a seaplane model on it [1]. The other three stamps might appear to show the same plane, but a close look will prove that each is different from the other [2, 3, 4], (Scott's B7, B8, B9).

The country with the most model plane stamps is probably Hungary. The 10f stamp [5] (Scott No. B132) was issued in 1941. It shows a Hungarian boy scout with a model plane. The design is clear and fairly simple except for the dipped wings. The 1.70fo stamp (Scott No. 900) was issued for Hungarian Children's Day in 1950 [6]. The next two Hungarian stamps—the large "spectaculars"—are the best ones to be found in stampdom. Both show gliders. The glider in flight [7] is different from the one under construction [8] The details in both stamps are excellent and sharp and the gliders ought to be fairly easy to build. Both these stamps are airmails and were issued in 1954 (Scott's C149, C150).

An interesting-looking model appears on a 1969 issued by Russia (Scott No. 3684). The stamp is described in the catalog as showing "model aircraft" [9]. What it actually depicts, is anybody's guess—it might be a glider. It certainly has an odd-looking tail. Build it and see if it flies. The other Russian stamp shown here [10] is excellent. It was issued in 1958 (Scott No. 2068). The wheel struts seem rather fragile, but the model itself looks good, and the engine shows how advanced the model building hobby was in Russia fifteen years ago.

A fairly common plane model appears on a 1954 stamp of the Netherlands [11] (Scott No. B264). This one can be easily made by modifying a stock, American-made balsa model. More difficult to make will be the Brazilian model [12] shown on a 1951 stamp depicting a model plane contest (Scott No. 713). In the background is the face of the famous Brazilian aviation pioneer, Santos-Dumont.

Another interesting-looking model (note the tail assembly) appears on a stamp of Yugoslavia [13] issued for a 1950 Aviation Meet (Scott No. 295).

The next stamp clearly shows the world-wide popularity of the model airplanes-building hobby [14]. It is from the People's Republic of China and was issued in 1958 to promote sports-aviation (Scott No. 394). Three different models are shown on the stamp. The center one, with its large tipped-up wings could be adapted from a stock balsa model, but the propeller would have to be added.

We'll close this gallery with the latest addition to it [15], a stamp of East Germany (Scott No. B78) issued in 1961 for the Young Pioneers' meeting at Erfurt. This seems to be another clearly shown model, and not difficult to build.

Most of the stamps that we described here are not expensive and can be obtained without difficulty. If you can't find them, a postcard to the author care of the Editor of JR. AMERICAN MODELER will bring you the name of a mail-order stamp dealer who can supply them.

An interesting way to display such a real-life postal model would be to make the airplane (or glider) itself and show it together with a nicely mounted display of the various stamps that show these models, plus a photo-enlargement of the stamp from which you copied the model.

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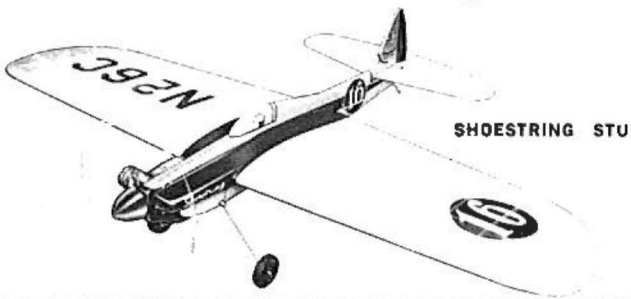
Mark Kubacki

MODELERS-
Let us hear YOUR experiences!



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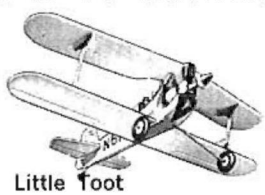
MOVE UP TO CONTROL LINE!



Little Toot

LITTLE TOOT — Sporty Biplane, for .049 engine, all die-cut balsa. $4.50

LI'L WIZARD — Shaped balsa wing, die-cut fuselage, 21" span, for .049 engine..... $4.50

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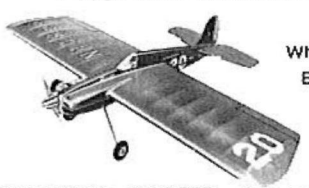
P-40 FLYING TIGER — 18" span, all balsa pre-fab for .049 engine. $3.95

LI'L JUMPIN' BEAN — 21" span Favorite ½A stunt model. $3.95

SWORDSMAN 18 — Die-cut balsa, 18" span. for .020-.049 engine. $3.95

PROFILE STUNTERS



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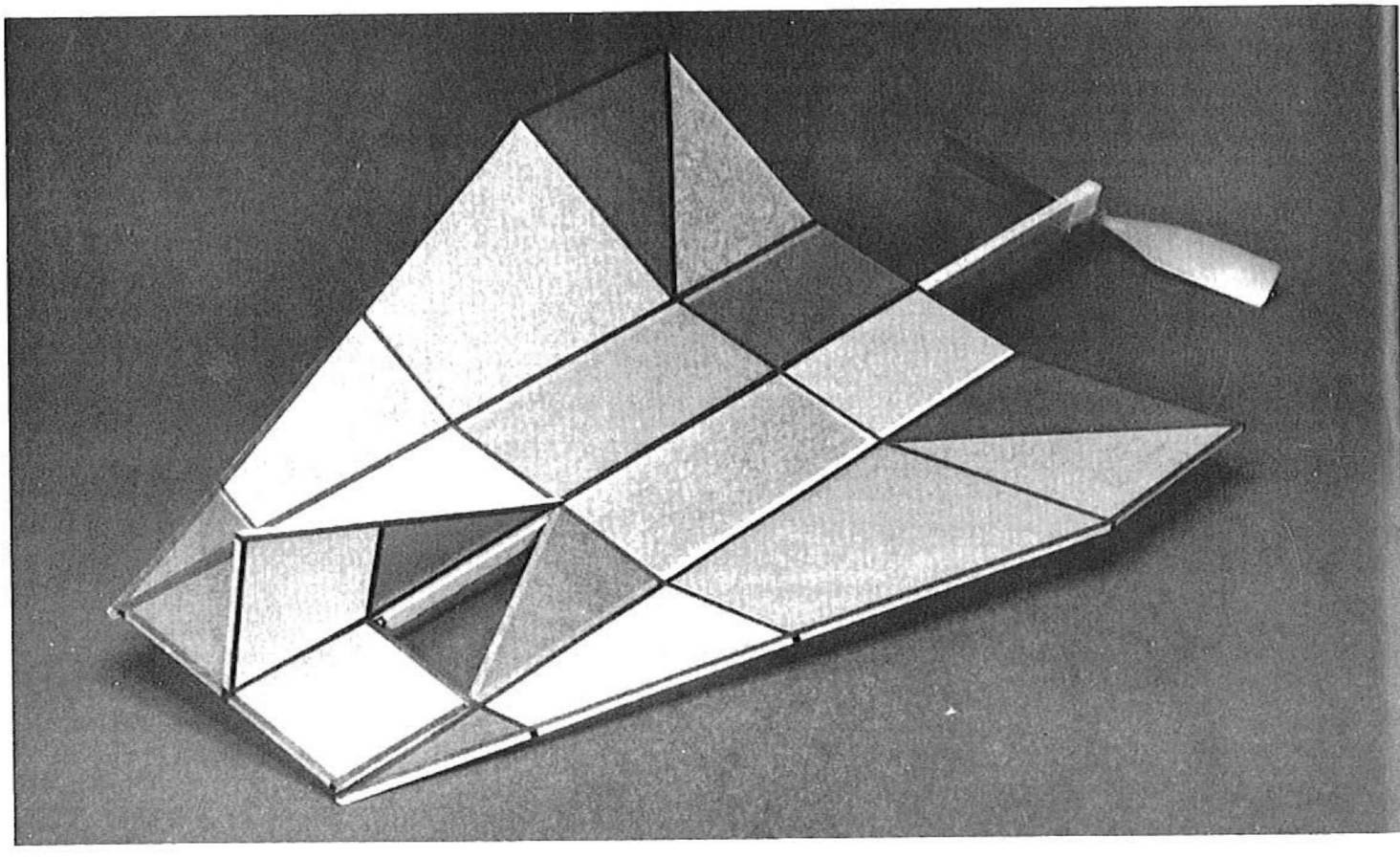
The Stained-Glass Window

A rubber-powered kite, the man called it! Or maybe it's a flying carpet. If you fly it in the church parking lot, you'll have a nifty excuse when the reverend comes out to investigate. Using the full-size plans on the next two pages, you'll find it almost puts itself together. / by Bill Hannan



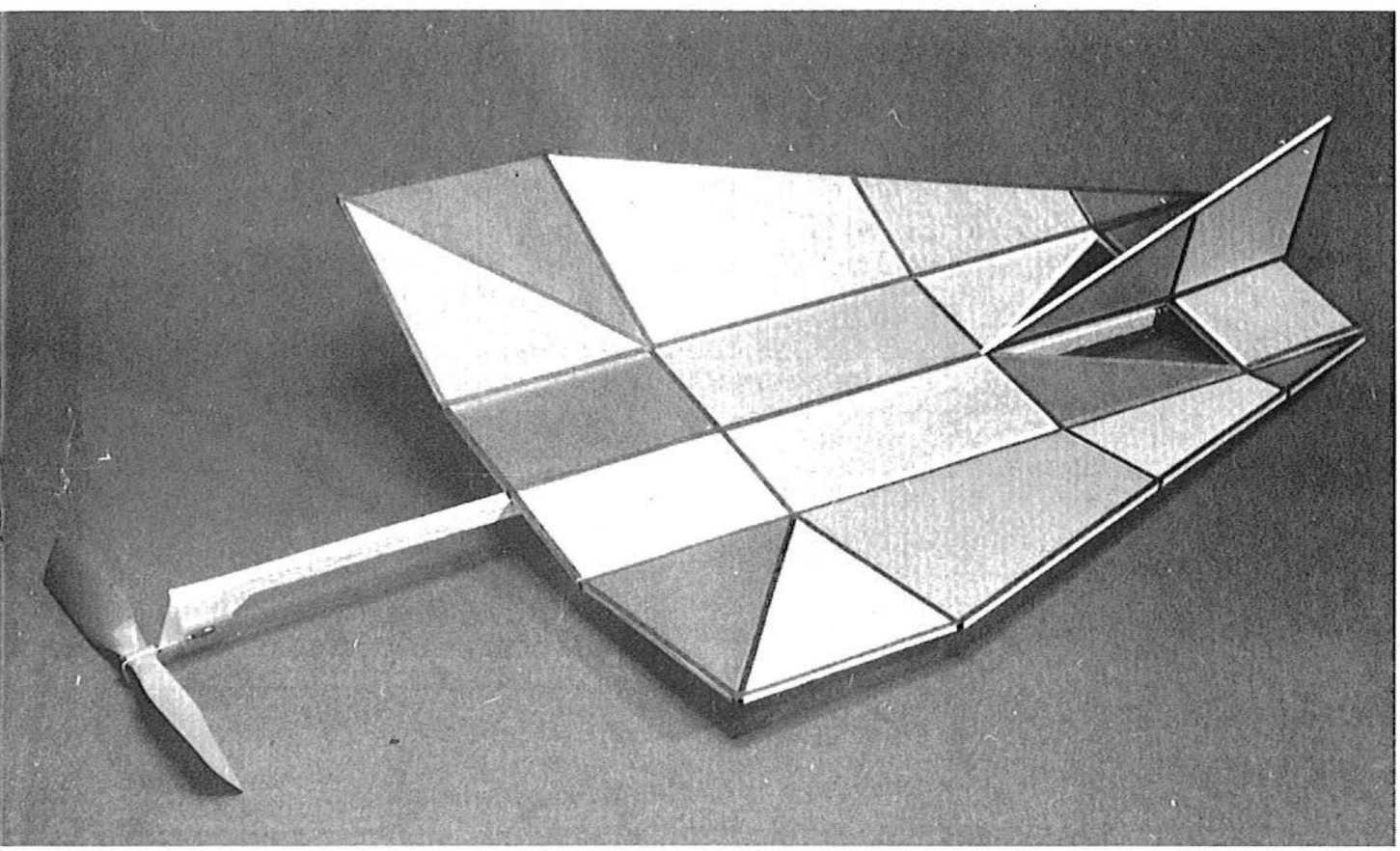
Here is an easy-to-build little flyer that attracts a great deal of attention wherever it is flown. It is the most recent in a series developed by the author which was based upon kites. An earlier and larger model called "Stringless Wonder" was published in the April, 1971 American Aircraft Modeler. Both designs have placed well in flying-wing contests sponsored by the Northrop model airplane club, and enlarged versions have flown with CO_2 and glow-engine power.

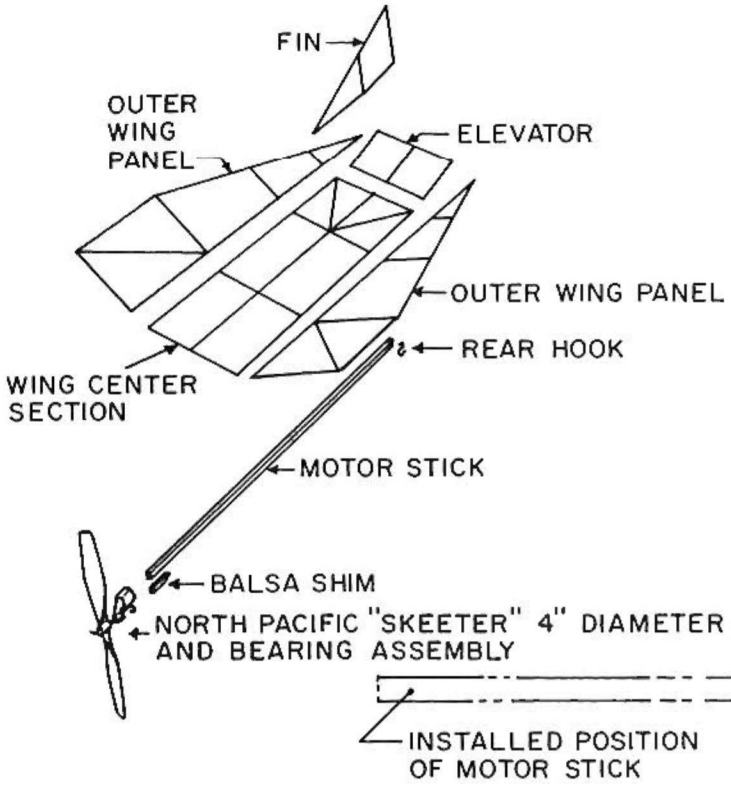
Construction: Since our plan is presented actual size, you can begin building right away, after protecting the drawings with a sheet of clear plastic wrap. Select straight fairly light 1/16" square balsa strips, with the exception of the leading edge members which should be hard grade to withstand possible impact damage during landings. Cut the longest pieces first, and use the leftover portions for the short members. In this way, very little precious wood will be wasted. When pinning the strips down, angle straight pins inward on each side, rather than piercing the wood, which would weaken it. The original model was constructed with "Titebond" glue, which worked very well. Note that the outer wing panels and elevator are not glued to the wing center section until later.

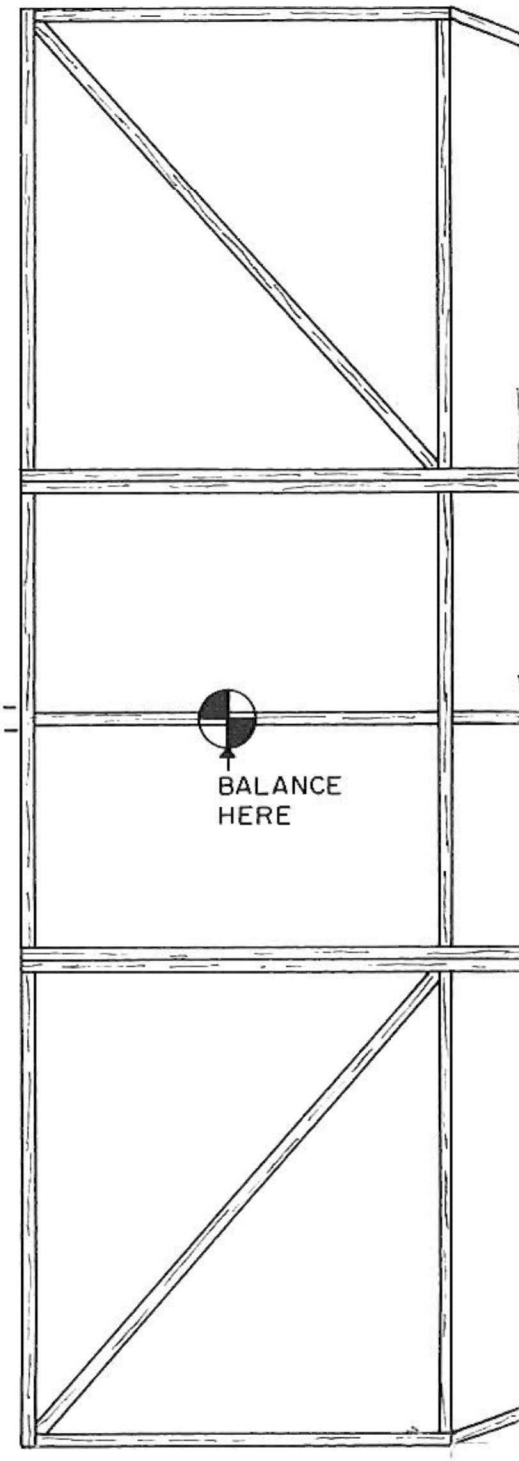
After the frames have completely dried, carefully remove them from the building board. Lightly sandpaper the structure to remove any lumps of glue or other roughnesses, before covering. It is also a good idea to inspect each glue joint carefully, and if necessary, to recement.

Covering: Here's a good chance to let your imagination run wild! The more colors, the better. Use any arrangement of your choice, but it is best to try the general effect with bits of tissue before affixing them in position. We located a great variety of colored tissue available by mail from: Marlow Engineering, 6850 Vineland, North Hollywood, Ca. 91605. Tissue may be applied in either of two ways: One approach is to

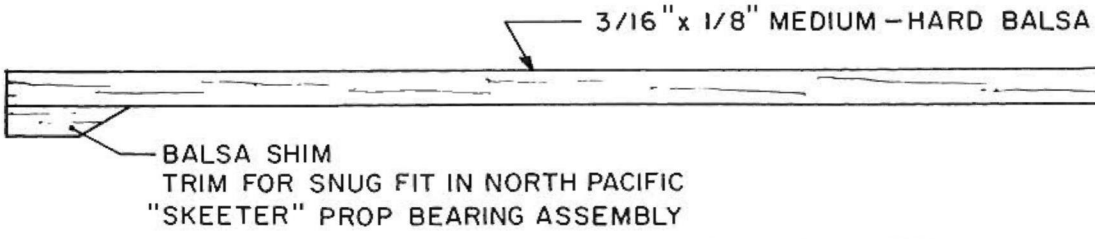
Plans on next page
Text continued on page 56

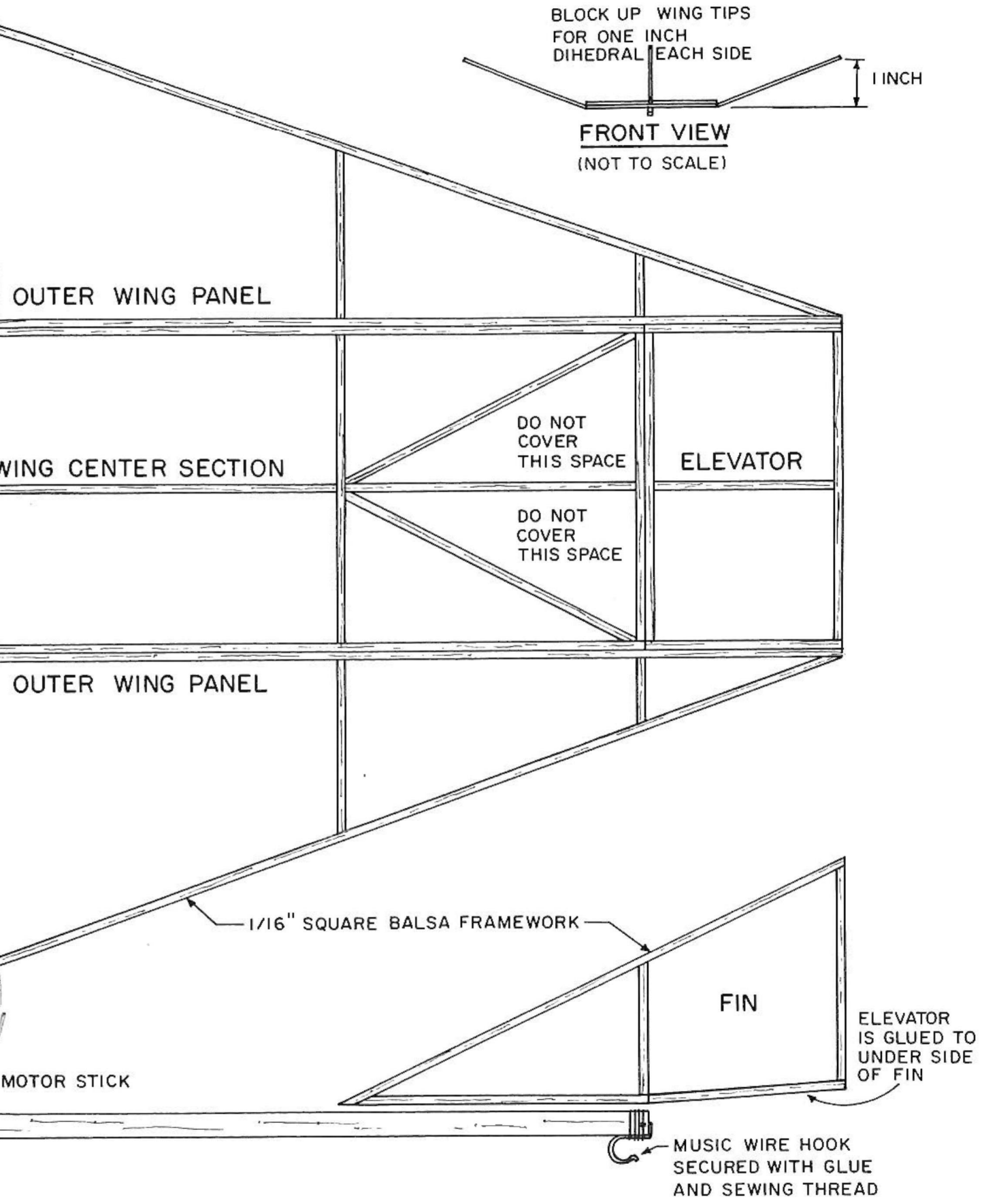






FOR BEST VISUAL EFFECT, COVER MODEL WITH A VARIETY OF TISSUE COLORS.




BLOCK UP WING TIPS
FOR ONE INCH
DIHEDRAL EACH SIDE
1 INCH
FRONT VIEW
(NOT TO SCALE)
OUTER WING PANEL
WING CENTER SECTION
DO NOT
COVER
THIS SPACE
ELEVATOR
DO NOT
COVER
THIS SPACE
OUTER WING PANEL
1/16" SQUARE BALSA FRAMEWORK
FIN
ELEVATOR
IS GLUED TO
UNDER SIDE
OF FIN
MOTOR STICK
MUSIC WIRE HOOK
SECURED WITH GLUE
AND SEWING THREAD

HANDY HINTS

HOW TO COVER WITH SILKSPAN

SIMPLE 'WET' AND 'DRY' METHODS ARE DESCRIBED. / by George Wilson

My late experience with trainer-type model airplanes has made me realize that Silkspan is still a reliable material that is inexpensive, lightweight and relatively easy to use. Consider why we use covering material: (1) To cover open framework with a light durable material, (2) To increase the "puncture strength" in wood covered areas, (3) To cover wood grain easily and with little weight increase.

Silkspan more than adequately meets these requirements in most cases. If extra strength is required, such as in the wings of U-control models, the heavier grade of Silkspan may be applied, or two layers of medium weight may be applied with their grains running crosswise to each other.

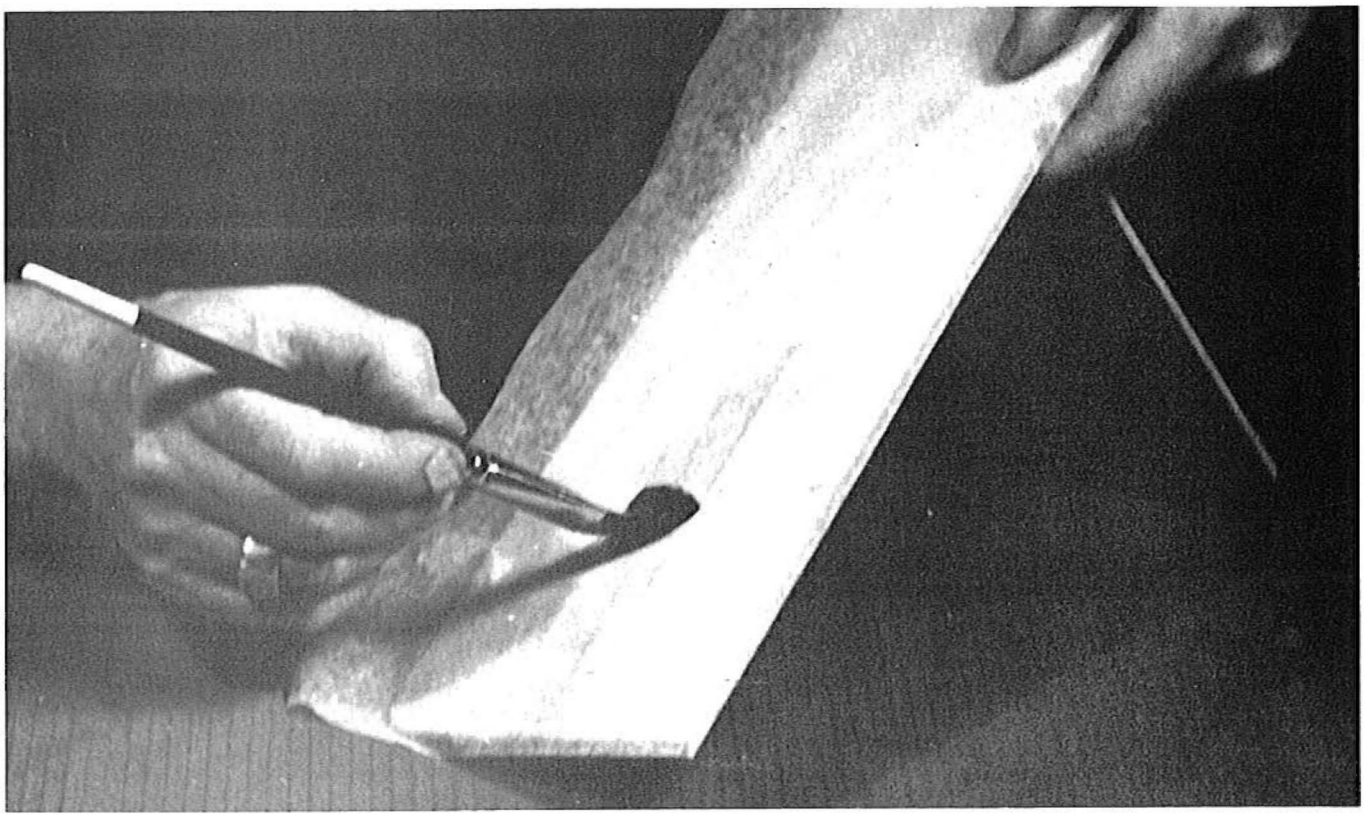
Silkspan comes in three weights:

00—For large lightweight models, such as rubber-powered duration models. This grade is ideal for covering the solid wood areas of most any type model.

GM—For small "Gas models."

SGM—For large "Gas models" and any area or type of model that requires extra strength.

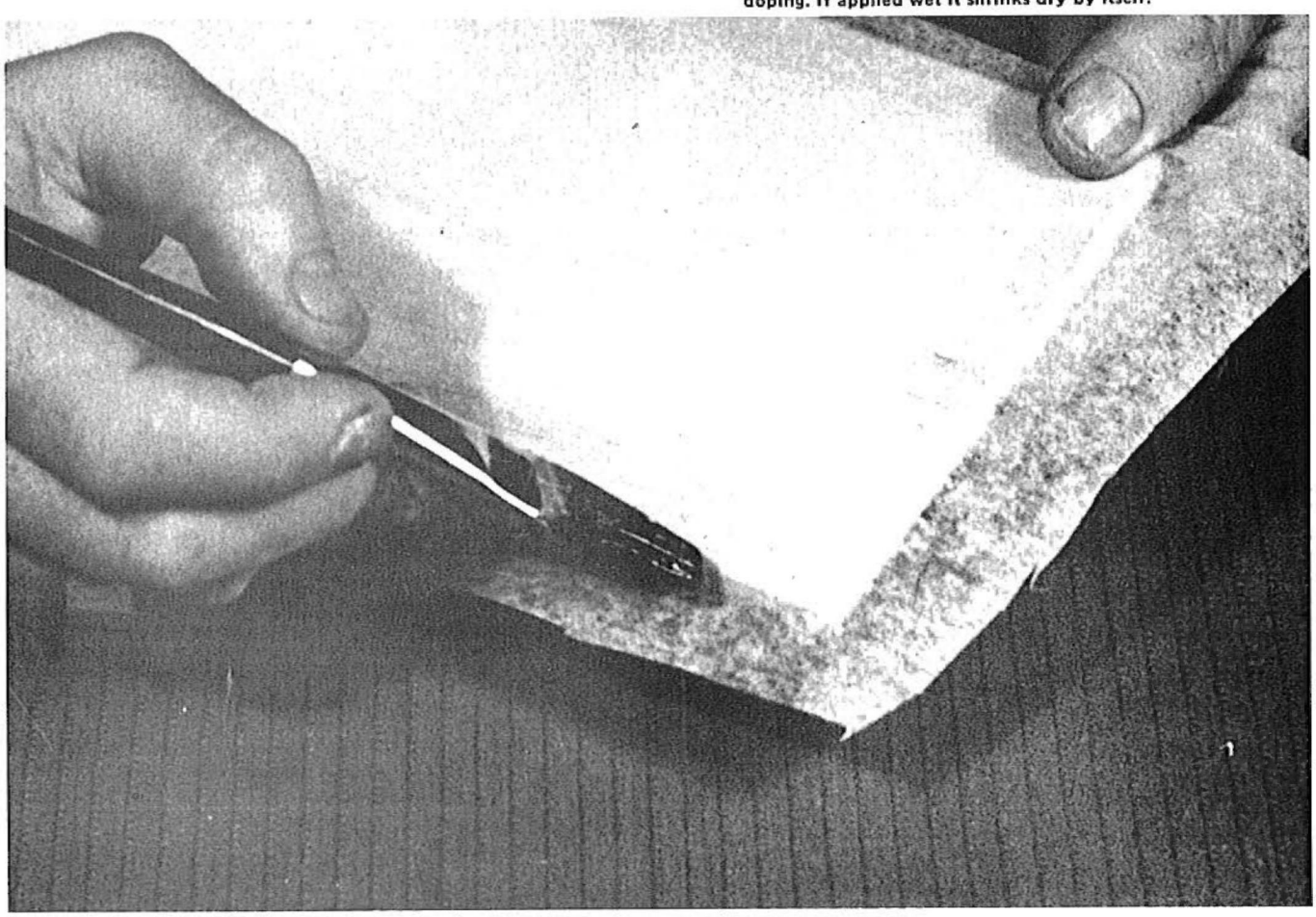
Silkspan normally is obtainable only in white. When used without colored dope (except possibly for trim) it provides a shiny, off-white finish when coated with 3 or 4 coats of dope. Where the Silkspan has to be lapped over itself, the sanding between coats of dope will thin the lap down and make it almost unnoticeable. If you trim the edges to allow 1/8" wrap-around, you will provide a double thickness at all the corners where added strength is needed. All parts of the model that will touch the Silkspan should be given a coat of dope before you start covering. Allow the dope to dry and sand smooth.

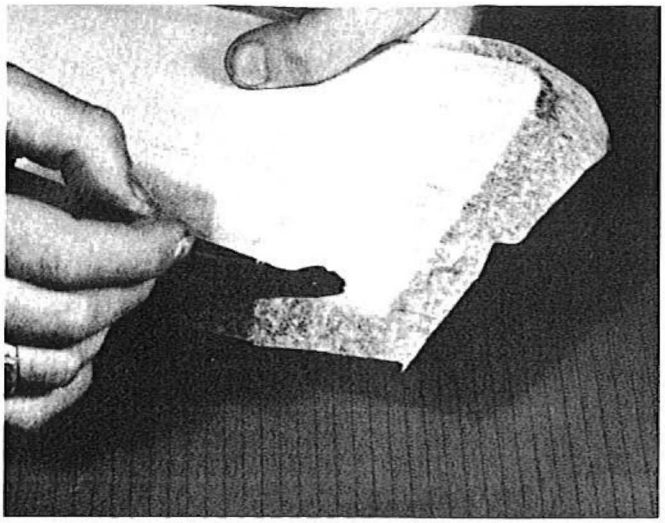


Photos by Ed McCarty and George Wilson

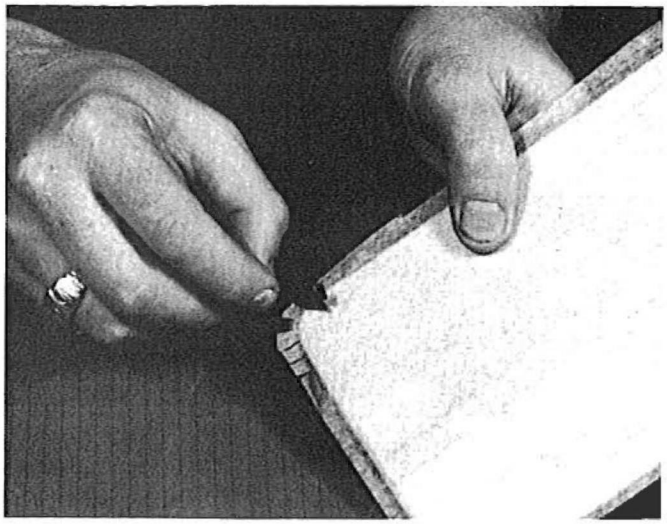
1 When wood is covered with dry Silkspan, dope the entire area to be covered. Cut paper oversize (as shown) and dope through it until it adheres evenly. Dope from center (spanwise), and smooth out with fingers toward the edges. Before doping the paper in place, the wood surface is given a coat of clear dope, and sanded lightly with fine sandpaper. This eliminates "fuzz" and provides a base to which the paper can stick.

2 Here's another method for applying the paper. After preparing the wood surface with a coat of clear dope, lightly sand when dry, and dope the paper to the wood around the edges only. Paper can be applied with either the "dry" or "wet" method—that is, paper is dipped first in water, placed on absorbent household paper to take out excess water, then laid over the wood. In dry paper method, it is sprayed with water after attaching to wood and shrinks tight when dry—ready for final doping. If applied wet it shrinks dry by itself.

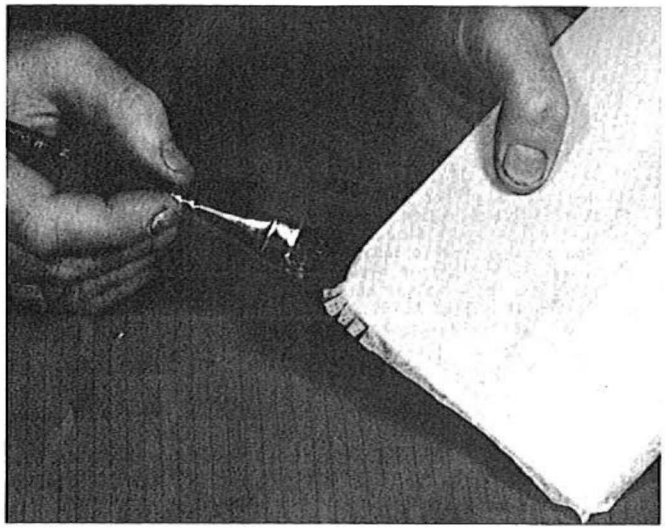




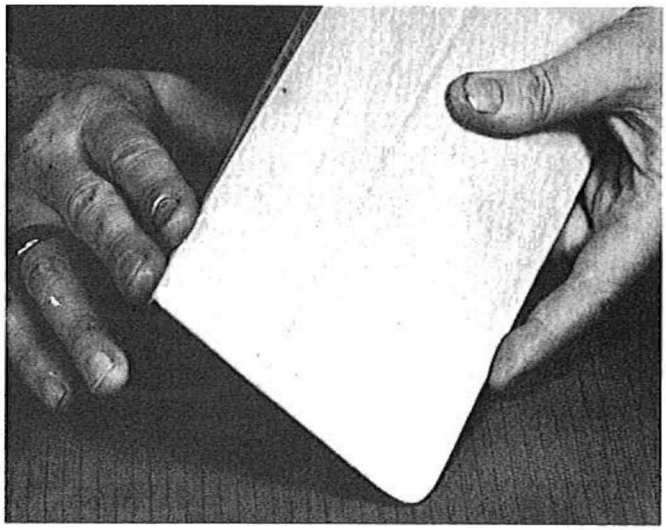
3 Don't do this! Bunching or "lapovers" of the paper when applied and doped causes unsightly wrinkles. Wrinkles can be avoided by pulling out wet-doped paper toward the edges. Experts occasionally have to pull off a section of paper completely, and then recover, to get rid of wrinkles.



4 When dope is dry, trim Silkspan around the edges. While wet, it should be lapped around edges of wood for extra strength. Around curves, the paper edges are "diced" as shown before they are doped down. The sharper the curve, the closer the dicing slices should be. Each piece is then rubbed down with finger after applying more dope to pieces.

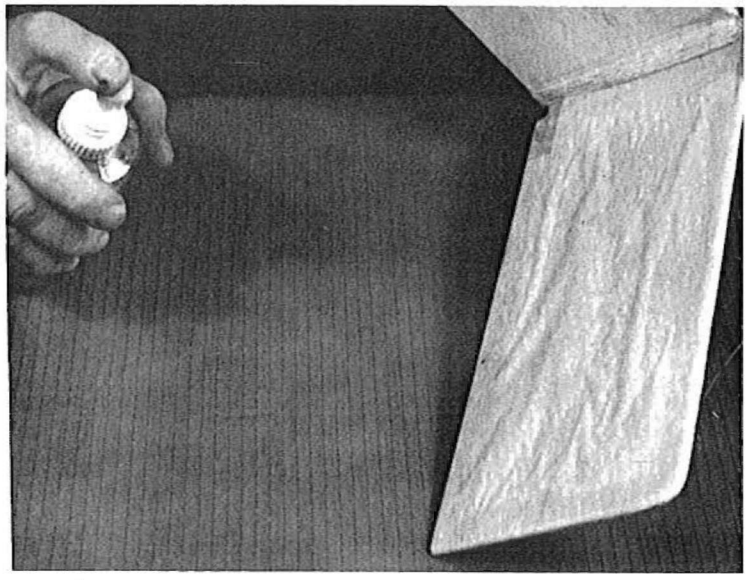


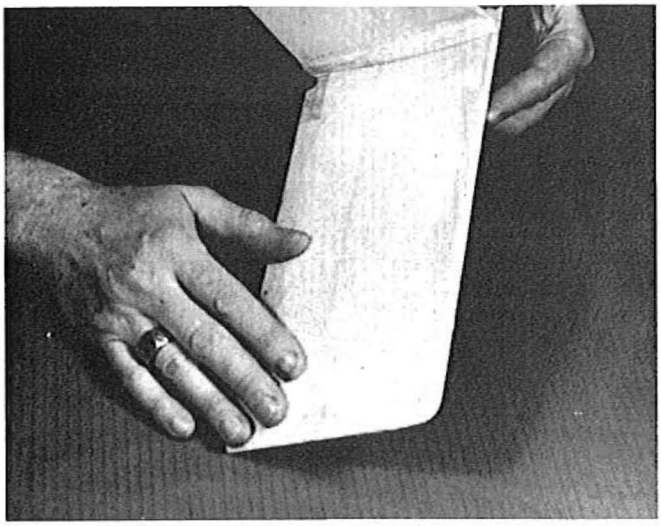
5 Although a tight-radius wing tip is shown, the method displayed applies to all wing and tail tips, however big the curve. You then may not need as many "diced" edges. These tiny segments are doped down with a brush and rubbed smooth with the fingers. They may overlap but there won't be any wrinkles.



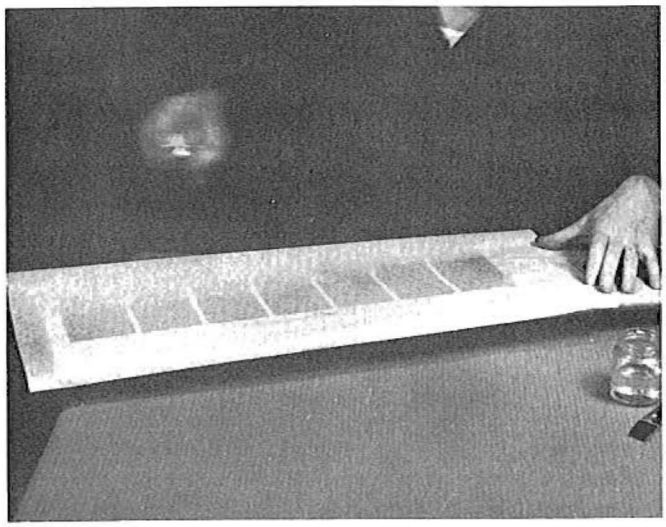
6 Straight edges are doped down and rubbed out with the fingers. You may have to repeat the operation several times before the edge of the paper lies neatly in place. Sections extending around the wood to the other side are trimmed off neatly when dope is dried.

7 In this picture the author is wetting the dry-applied Silkspan with a handy atomizer. The paper looks horrible when wet, but shrinks to drum-tight surface when dried. It is then ready for doping all over.

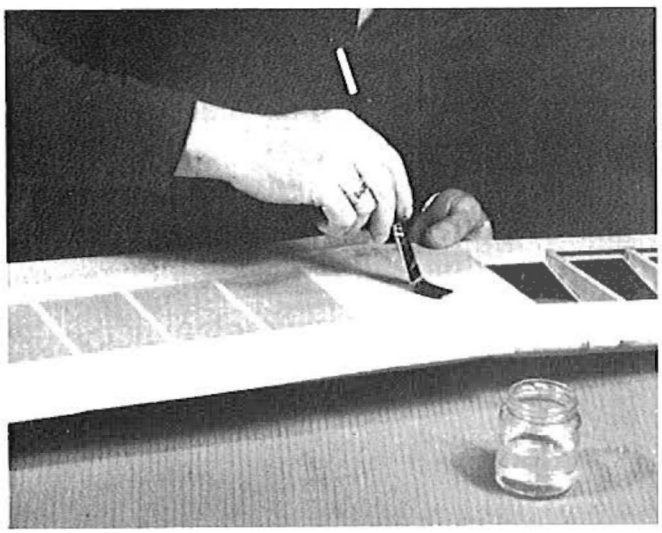




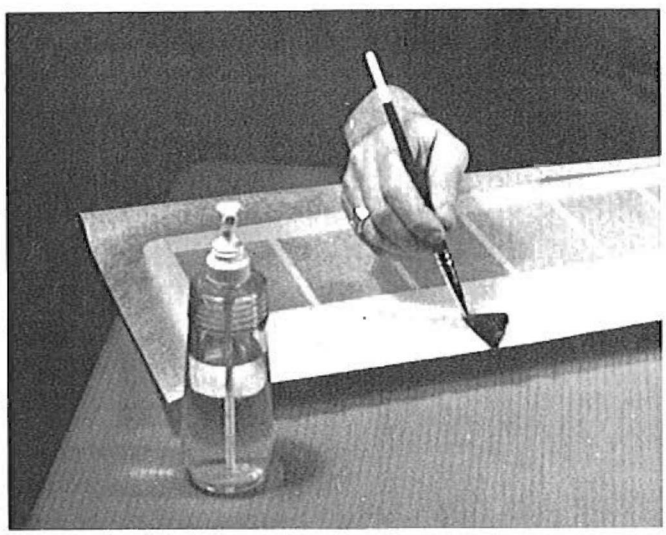
8 You see, it is wrinkle-free when dry. Over the wood areas minor wrinkles can be smoothed out with a finger tip when later coats of dope are applied. Keep smoothing out wrinkles while dope is still wet.



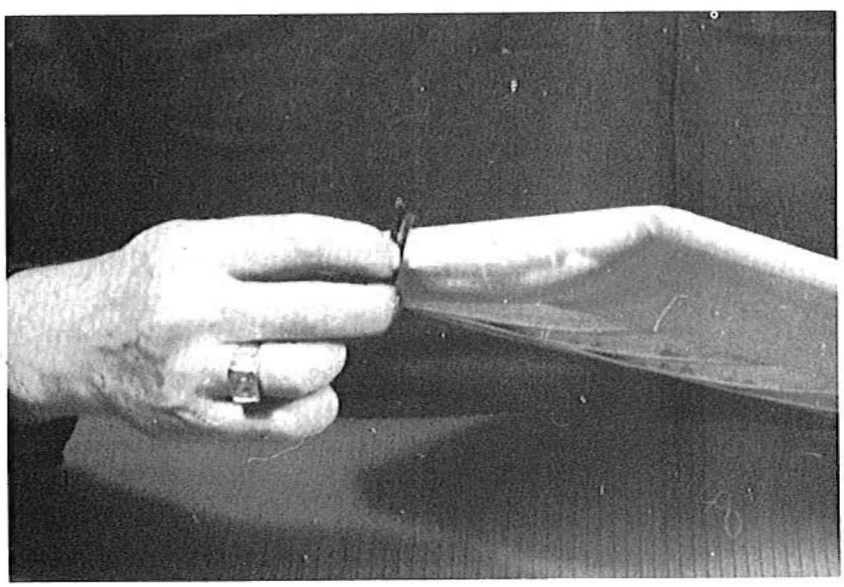
9 When covering open areas, cut Silkspan roughly one in. extra all around. Lay paper in position, then spray with water. Paper should be very damp, but not dripping wet. Before covering, the framework should be given one thorough coat of dope; when dry, all surfaces which contact the paper are given a final light sanding.



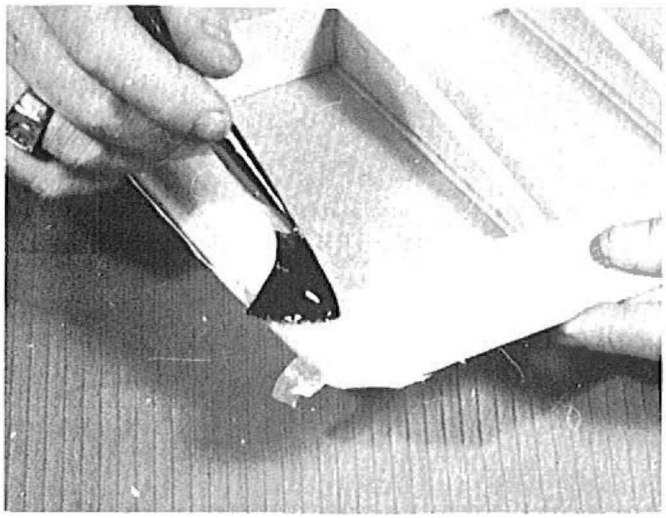
10 Now apply dope full strength around the edges only—be generous with dope which flows easily through the paper. Heavier grades of Silkspan wrinkle a little when wet; lighter grades pucker considerably.



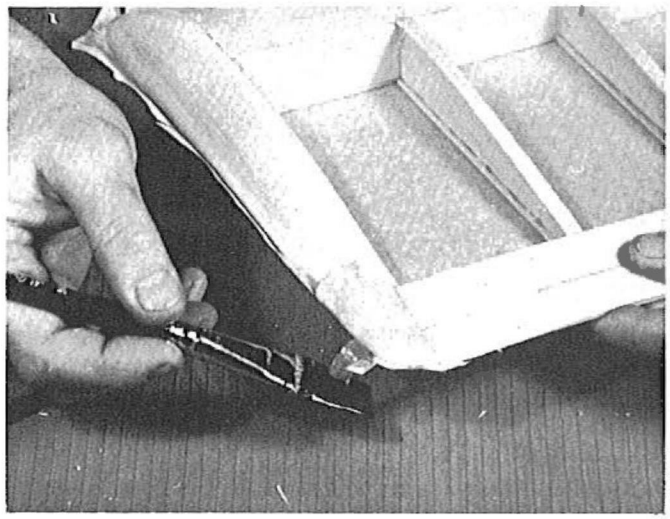
11 Work quickly as you apply dope around the edges. If the Silkspan begins to dry and tighten, respray with water. If dope turns white due to moisture, it will disappear with first coat of finishing dope.



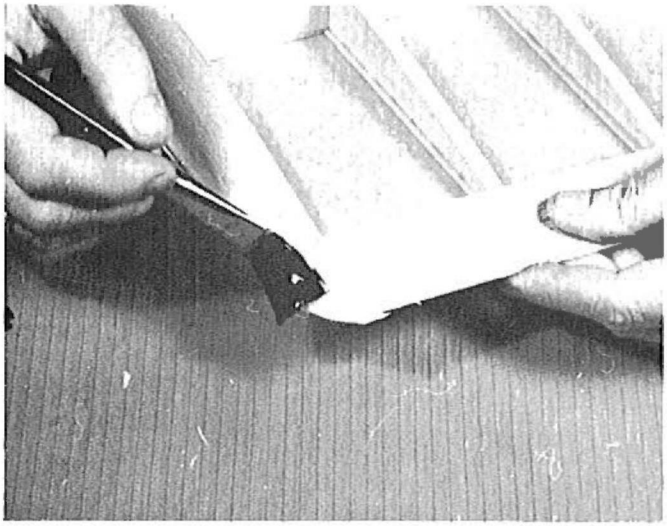
12 Use the trim and "dice" method for working around the compound curves. Cover bottom surface first, so that the final lap of paper will not show on top of the wing. Top surface should be the smoothest.



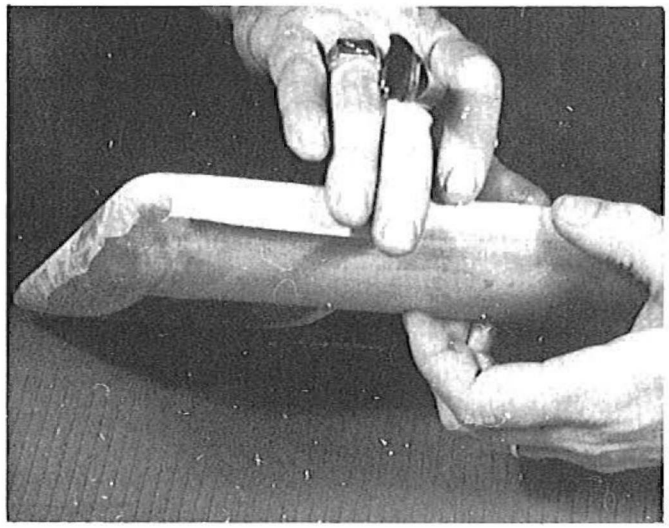
13 The Silkspan should wrap around the edges. Here, the bottom surface paper is being worked over the top of the wing tip block. When finished, top covering on, the material will be double thickness for strength.



14 Coat the edges generously with dope, using two fingers and the dope brush to smooth out the paper. Rub down firmly.

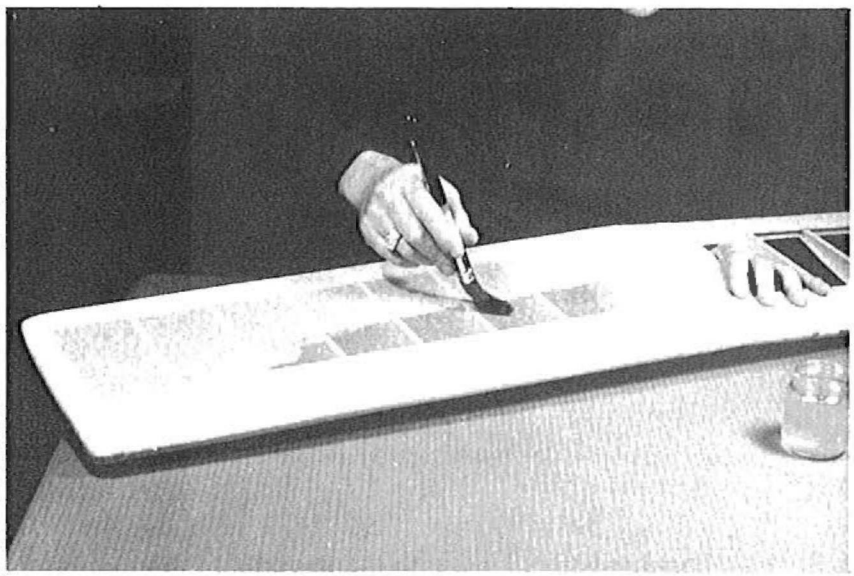


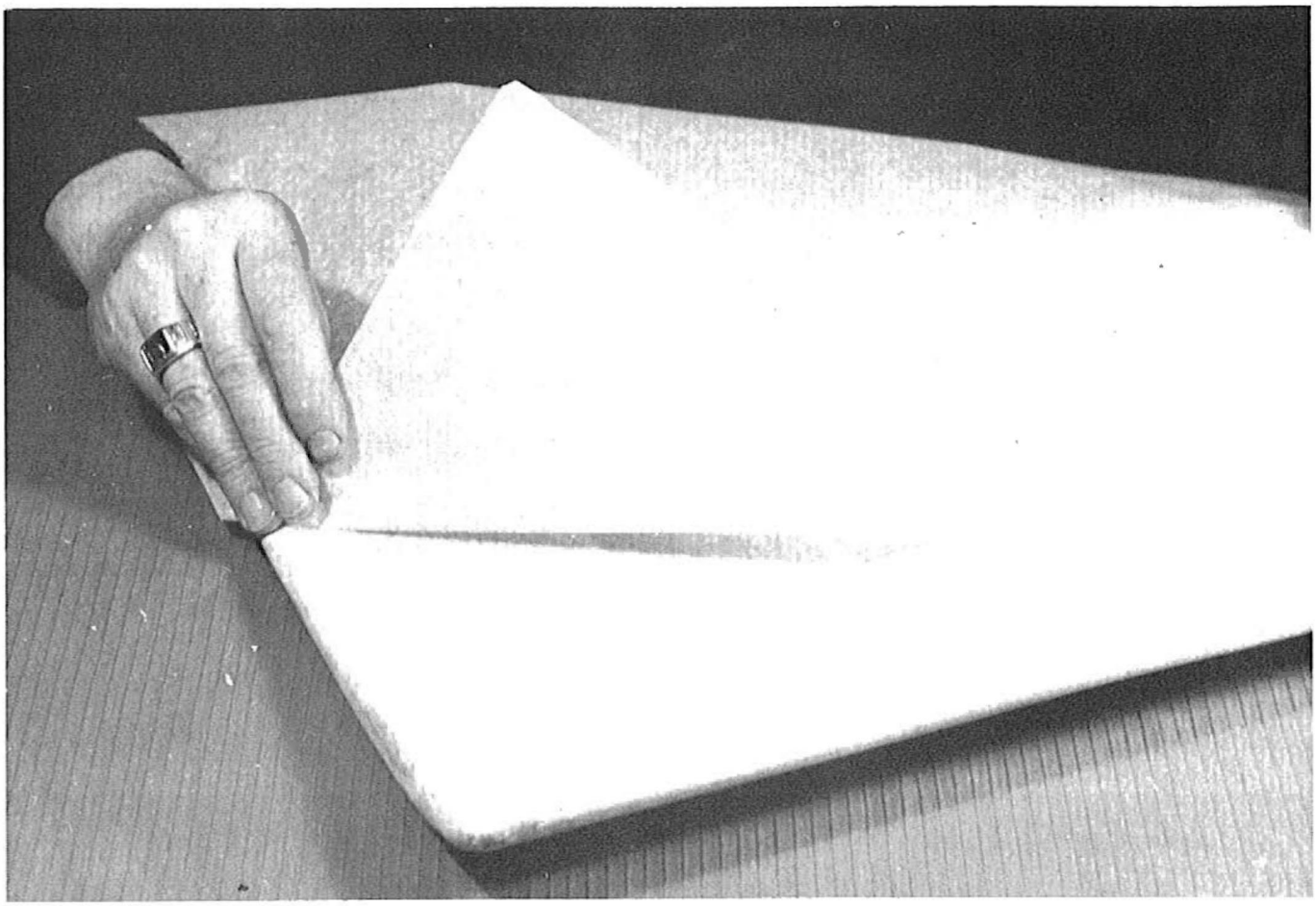
15 Silkspan will lap over itself where it was "diced." Ripples will disappear with light sanding between subsequent coats of dope.



16 You may easily smooth down straight edges with your fingers. Dry dope can be removed from fingers by peeling off, or dissolving with dope thinner.

17 Brush on, or spray, at least two coats of clear dope, diluted one part thinner to two parts dope. Add four drops of castor oil to an ounce of dope—to prevent over-shrinking and warpage of surfaces.





18 For added strength on large models, double cover. Grain of second layer of paper should be at right angles to grain in first layer. Apply one coat of dope to first layer before applying second layer. Follow the same procedure with second layer as you did on first.

Single sheets of Silkspan can be used to cover large areas that are flat, or only curve in one direction (like the top of a wing). Over compound curves (like streamlined fuselages) small areas are covered at one time using many small pieces of covering material. The wet-covering technique (see below under covering open areas) will assist in covering curved areas.

Silkspan may be applied dry over wood areas but should be applied wet over open areas. Flatten the folds before you start to cover; an iron may help. Don't be too concerned about the flatness of the material—the folds will pull out as you do the covering. Undiluted clear dope and a relatively stiff dope brush are used to attach Silkspan. Other materials such as "Library Paste" have been used but it is best to learn how to use dope right from the start.

To cover wood areas, cut the Silkspan to fit the area to be covered leaving a 1/4" or more border all around. Place the Silkspan in position and apply dope to the *outside* of the material, starting near the center and brushing outward to the edges, smoothing the wrinkles as you go. Smooth the Silkspan down with your fingers—the dope will peel off your fingers, or use thinner when you are all done. At the edges, it will be necessary to "dice" the Silkspan to make it fit around the curves. Dicing consists of cutting many little slices at right angles to the edge and doping down the tabs that are created.

Wood areas can be covered wet using the same rules as for covering open areas (see below). However, the method just given assures good contact and thorough dope saturation.

Open areas are covered by first cutting the Silkspan to the outline of the area to be covered leaving about a 1" border. The grain of the material should go lengthwise in most cases. Typically, the grain goes spanwise on wings to provide maximum strength. Lay the Silkspan in position and moisten it with water using a sprayer—sprayers from detergent or perfume bottles are suggested. Moisten, but don't make the material dripping wet. If the material dries too quickly during the covering process quickly respray it to keep it limp. Apply undiluted dope on the outside around the edges only. Smooth the edges down wrinkle free; the material itself will

(Continued on page 56)

OLD DART

IS THIS THE WORLD'S FASTEST PAPER GLIDER? YOU ARE CHALLENGED TO BEAT IT! / by Bob Harrah

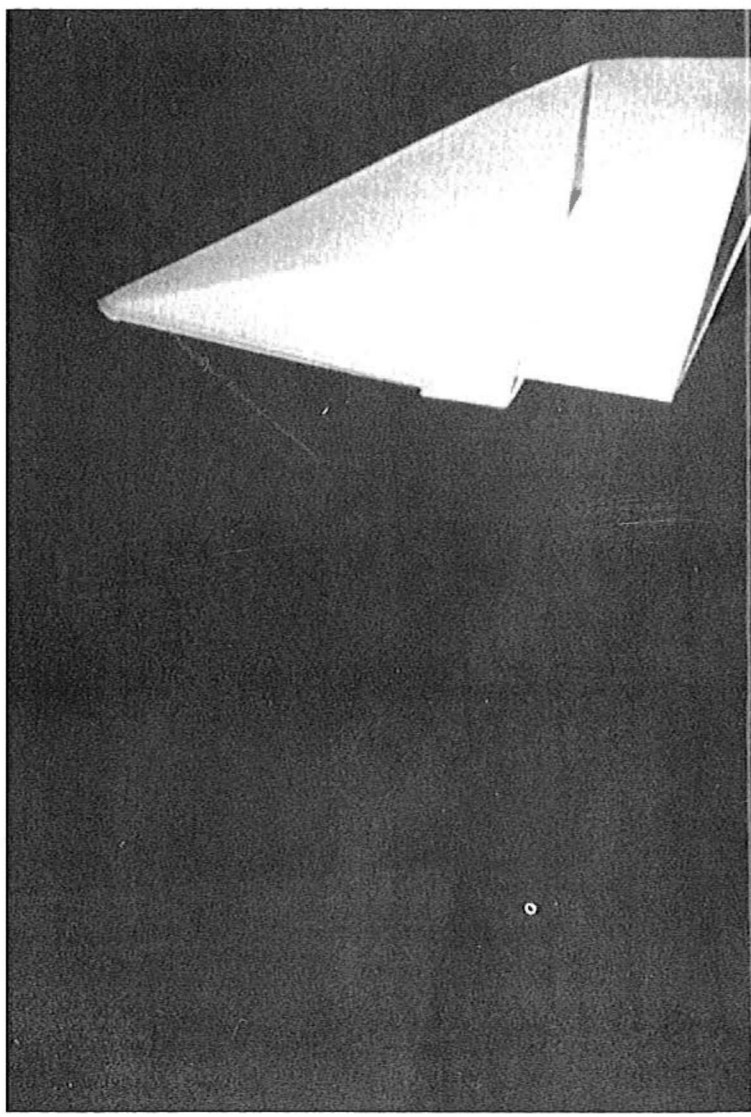
The writer recalls first using this glider in Santa Barbara, California in 1937. That makes both of us old-timers! The "Old Dart" would probably be called "Paper Delta" today, because it looks so much like the delta-wing jets.

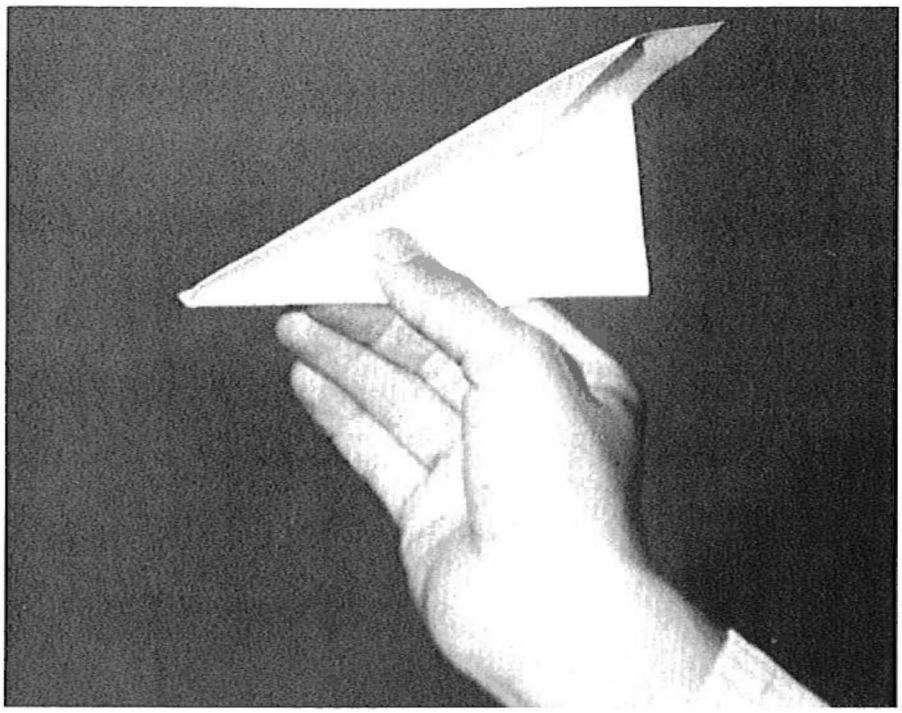
Through the years, I have had many opportunities to work with groups of young people. One thing that often happens is that a future airplane modeler will make a paper plane and send it sailing in the air—it is at this point I stop everything and show them how to build Old Dart on one condition, that they will never fly another paper plane in one of my groups unless it is better than Old Dart. They always agree, and learn to fly Old Dart. None have ever come up with a better flyer. Maybe you can!

I have seen many of these paper gliders catch thermals and fly out of sight. I used to put my name on them hoping someone would find one and return it, so I would know how far it went. This was like placing a note in a bottle and casting it into a stream or in the sea, hoping someone would return it so you could see how far it had traveled.

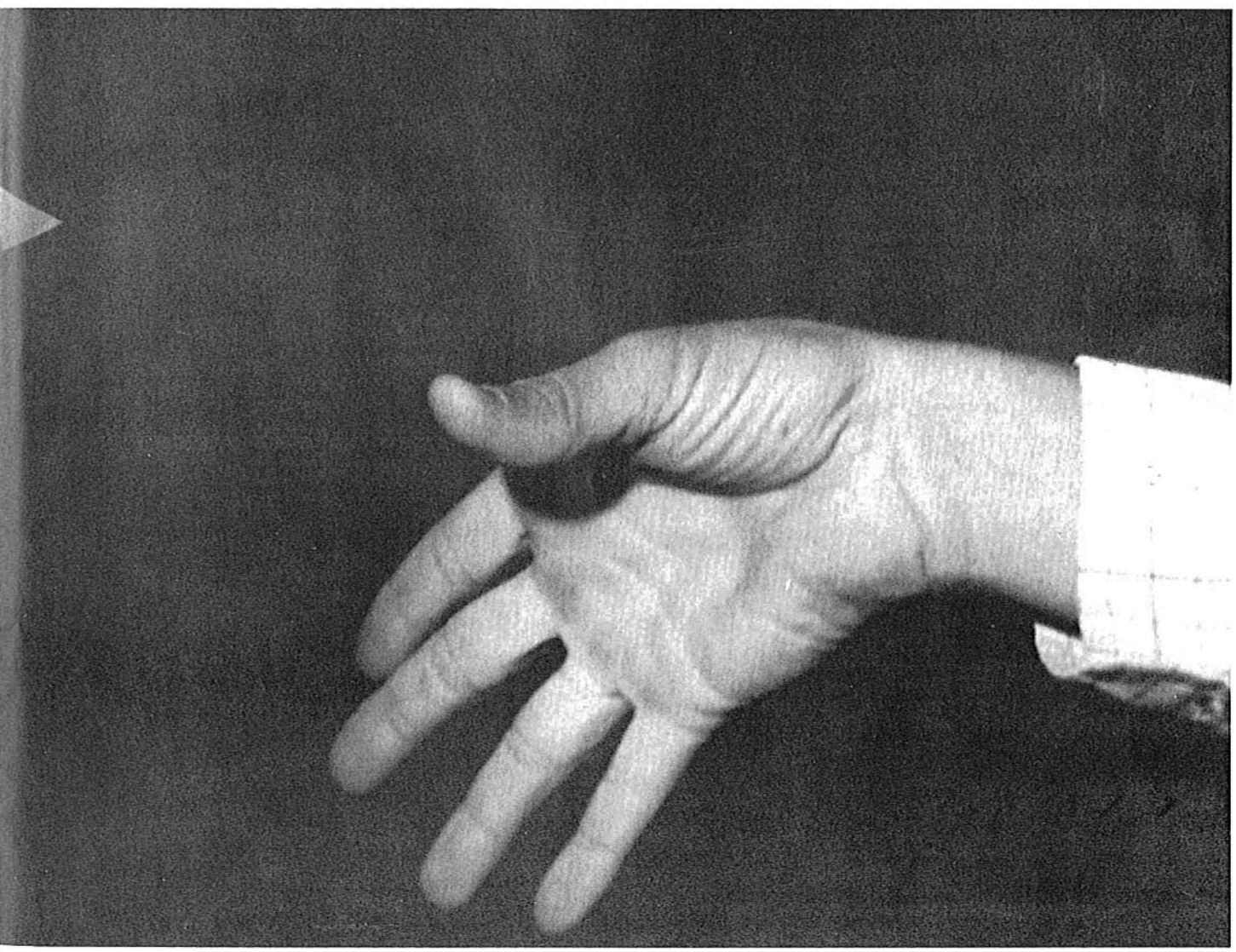
Trim: Rear tips may be bent up or down to help plane go up, down, left or right. The best launch I have found is a right and upward bank; if you are left-handed, use a left and upward bank. **Caution:** Please do not throw it at anyone. It could be very harmful to eyes. And don't be a litter-bug. Remember, if you can make a better one, I want to hear about it, in care of JAM.

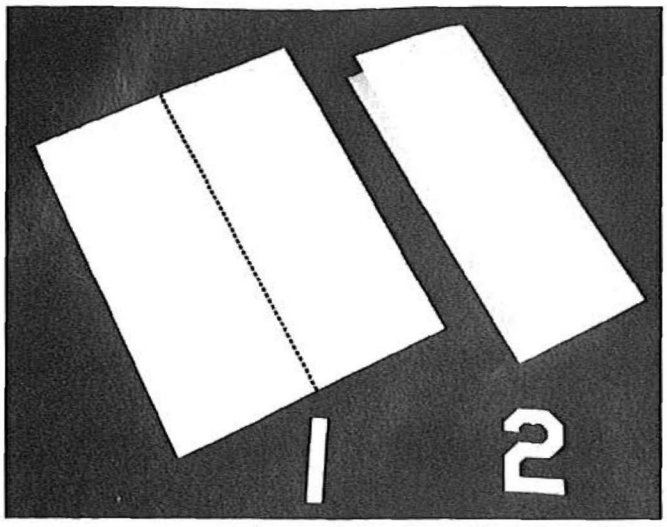
(Construction photos on following pages)



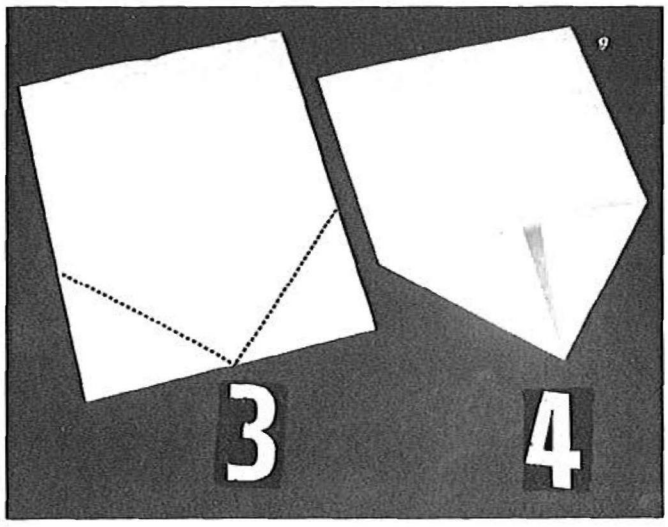


Left: This shot shows you how to hold Old Dart. It's "old" to Bob because he has been beating all challengers since the year one. It's new to us! Below: Launch. Believe it or not, that's all the man said, "Launch." So launch already. Be careful where you toss it—it could go supersonic.

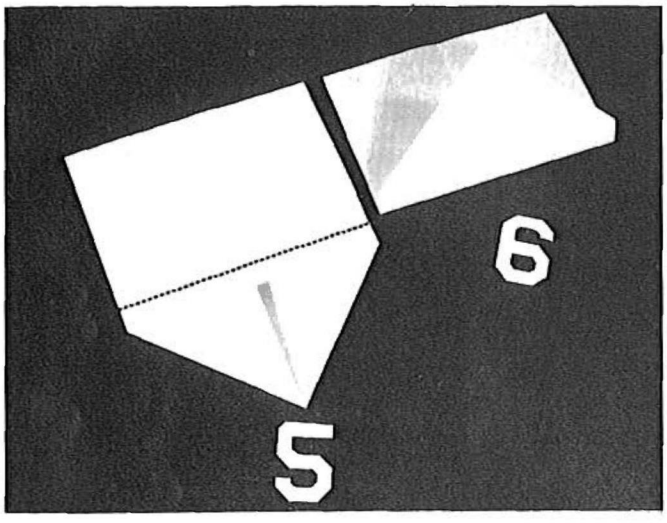




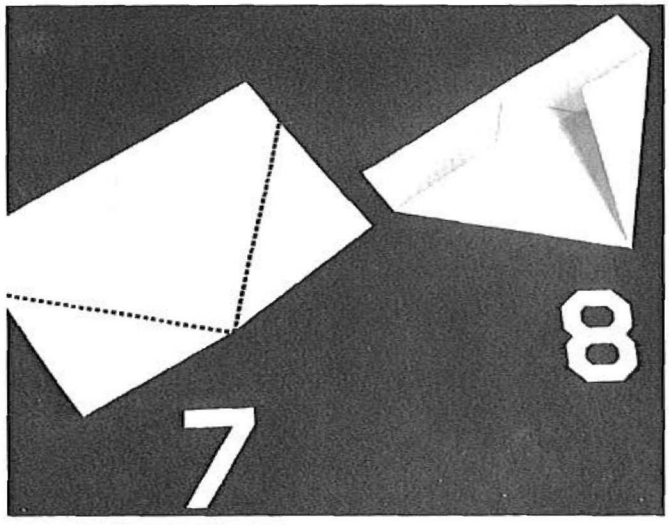
Steps 1 and 2: Fold a standard 8½ x 11" sheet of paper in half lengthwise. This will be the centerline you fold to, so each side will be of equal size and weight. You will find that some gliders fly better than others.



Steps 3 and 4: Fold lower left and right corners up to centerline—make good folds by squeezing paper between fingers and pulling through.

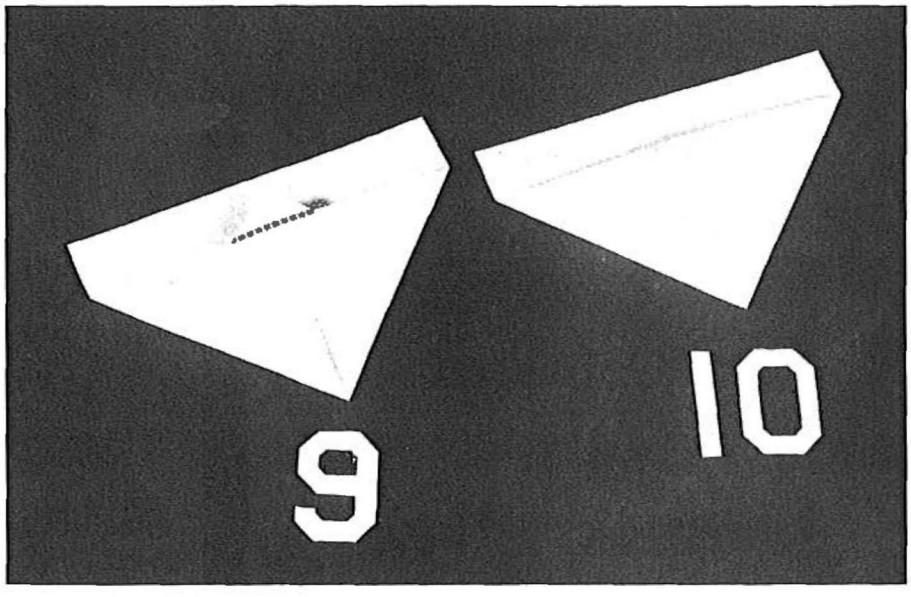


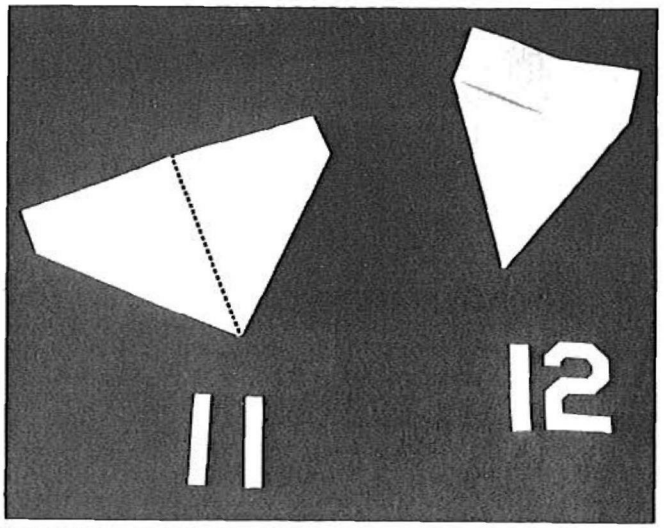
Steps 5 and 6: Fold this section about ¼" up from the edges of the parts folded in Steps 3 and 4. Make sure joints match the centerline.



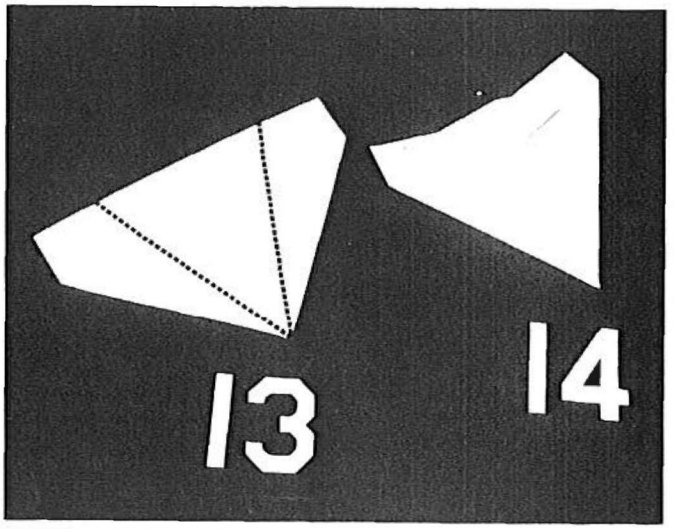
Steps 7 and 8: Fold lower left and right corners up to the centerline. No, we are not making envelopes—one at right would be a puzzler.

Steps 9 and 10: Fold the small triangle back over towards front, locking down the parts folded back in Steps 7 and 8. The plot thickens!

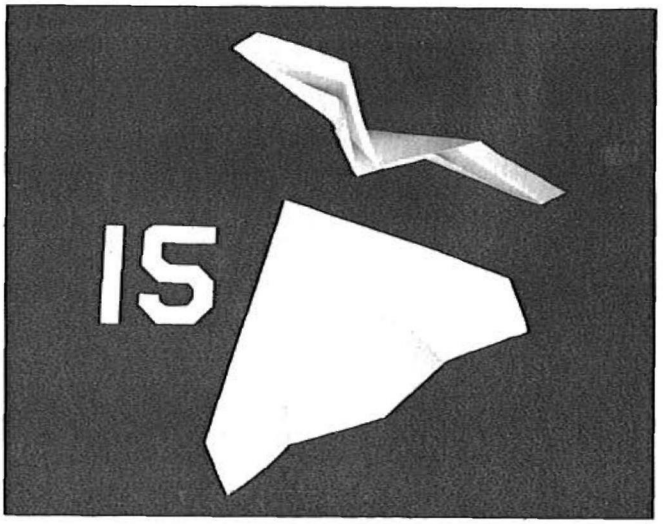




Steps 11 and 12: Fold at the centerline, making sure that the left and right edges match. Will this inspire a real homebuilt airplane?

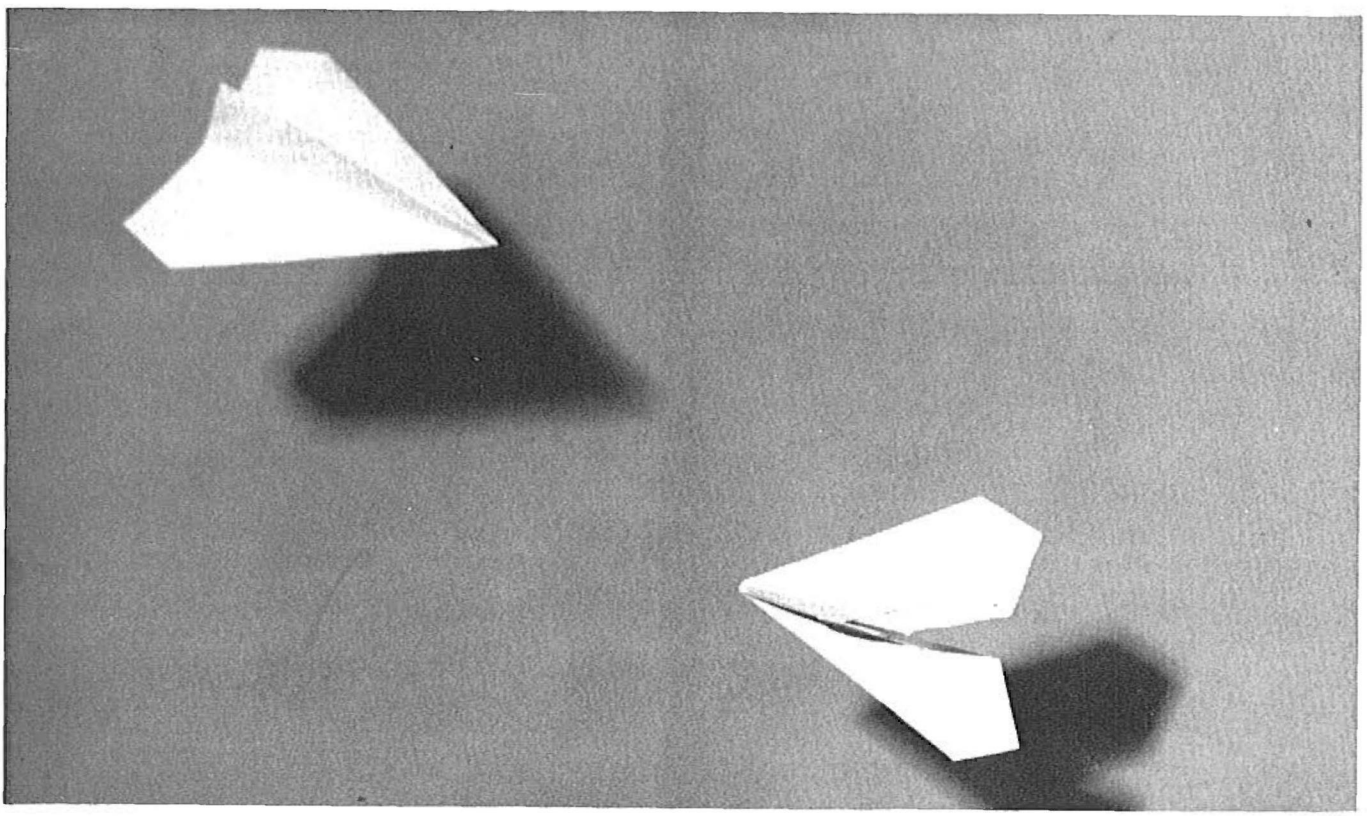


Steps 13 and 14: Fold left and right wing edges back to centerline. Say, Bob, this is as complicated as an RC. We've been five minutes!



Step 15: This shows natural or flying shape of Old Dart. But hold it, there's still more neat creasing to do before you take off for Paris.

Two Old Darts in a dogfight—well, you've got to allow a fella a bit of imagination. So it's a dogfight. That's the Red Baron inverted.



GOT THE 'BENDS'?

WIRE BENDING IS A NASTY LITTLE CHORE FOR ANYONE. HERE ARE SOME EASIER WAYS TO DO IT. / by B.I.G. Bend

Wire fittings are important parts of flying model aircraft, yet they remain bothersome items to many builders. A few suggestions may help clarify their fabrication and use.

Wire is the ideal material for landing gear legs, pushrods for control-line aircraft, and various other fittings where great strength is required. Actually, the type of steel wire stocked by most hobby stores today falls short of the traditional "music" or "piano" wire. However, the present material, though less resilient, is easier to bend and cut.

Selection of wire: Most kit and magazine plans specify the diameter of the wire required for each part, as determined by their designers. If you are designing your own model, you may have to do a little guesswork and experimentation. Bear in mind that, while slightly undersize, wire may flex excessively; oversize wire exacts a severe weight penalty. Since weight is the enemy of performance, it is perhaps better to err slightly on the light (small) side.

Tools: An ideal selection for forming and cutting wire would include the following: Regular "gas" pliers, long-nose pliers (sometimes called needle-nose), round-nose pliers, diagonal cutting pliers, heavy-duty cutting pliers, sturdy bench vise, hammer, screwdriver, triangular file.

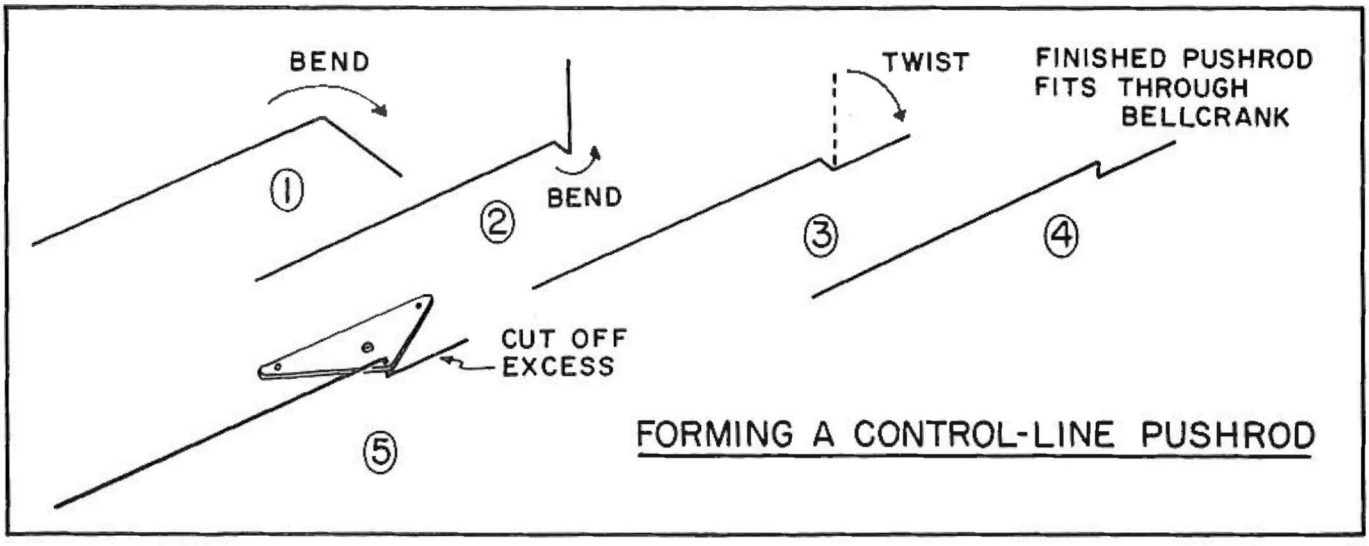
For small models, it is quite possible to get by with only the long-nose pliers and a pair of diagonal cutters, but for larger jobs, the additional tools are certainly desirable.

Preparation: It is always best to work directly over a full-size drawing of the part to be formed. In the case of some landing gear legs, be cautious, since the true length and angle of the parts may not be apparent from any single view, unless a pattern is provided. Drawing an accurate layout will save much frustration and wasted wire. As an aid to forming tricky parts, a "trial run" is suggested. By first bending the item to shape from some soft wire such as copper or aluminum, you will be able to determine the best sequence of bends with less difficulty.

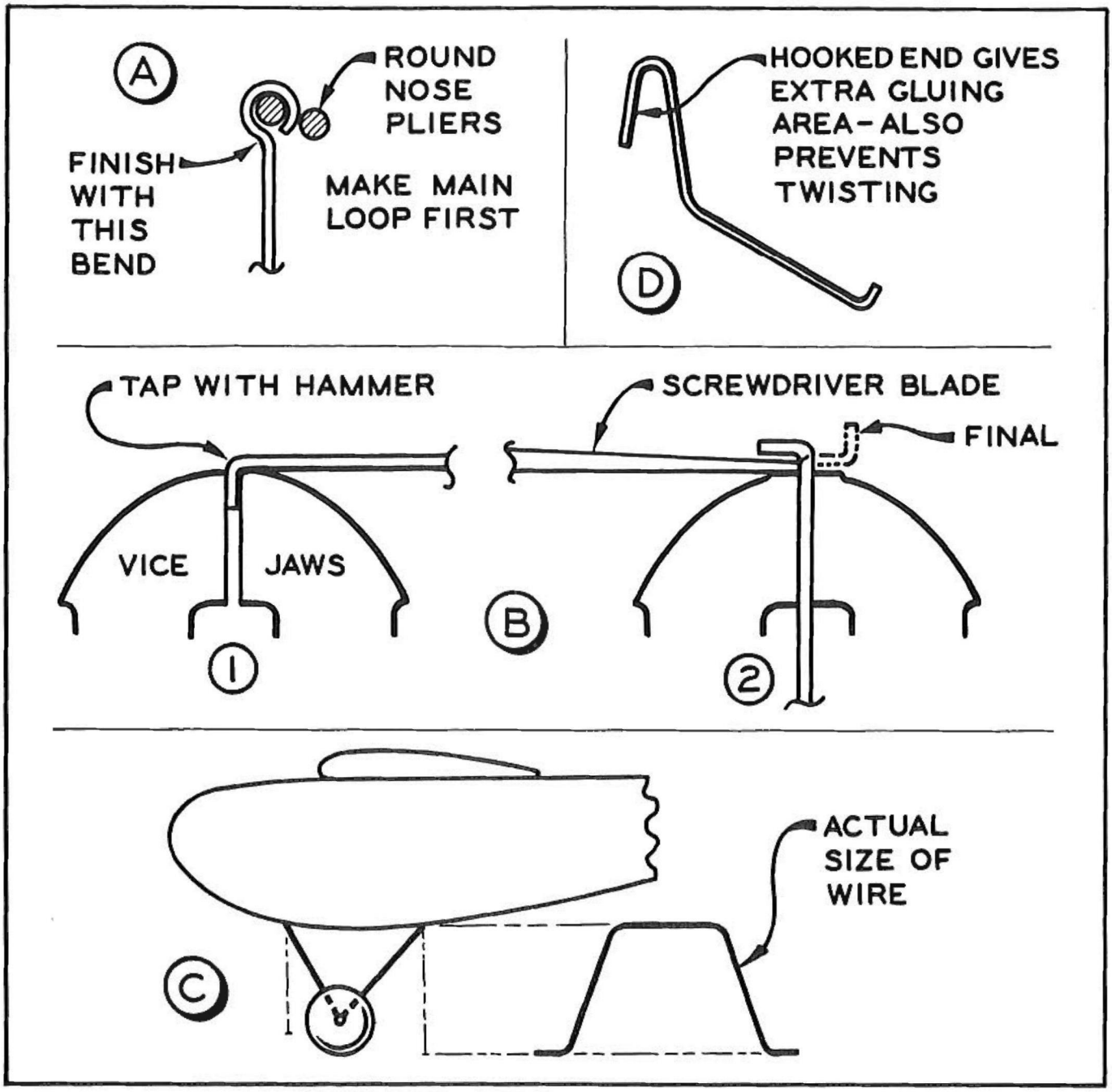
Before bending the actual part, clean the steel wire carefully to remove any grease or corrosion that may be present. A wad of steel wool with a few drops of dope thinner on it works well, or you may prefer to use very fine sandpaper. The location of each bend can be marked directly on the wire. Fine-point marking pens can be used if you are careful not to smear away the marks. Tiny dabs of light-colored paint such as white or yellow will also serve the purpose. Pencil is not suitable, as it does not contrast enough.

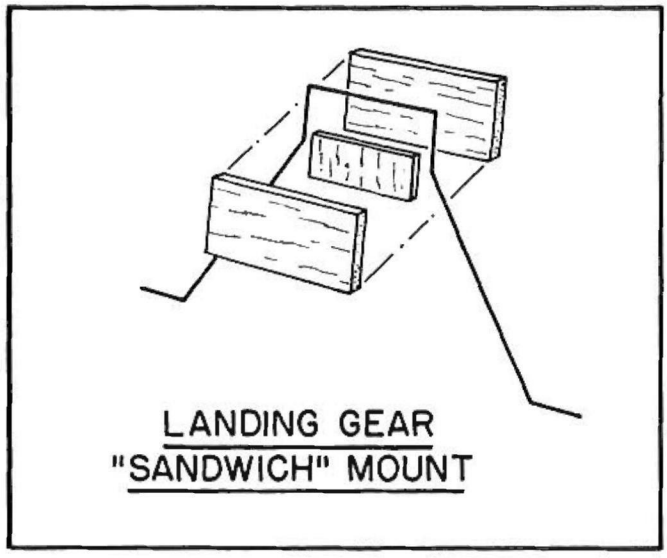
Small diameter wire can be bent with a single pair of long-nose pliers, although in some instances, two pairs will make the job easier. For neat rounded bends, such as employed in propeller hooks, round-nose pliers are very helpful. In the case of larger diameter wire, two pairs of pliers or a single pair of pliers plus a bench vise are almost a "must." In addition, a hammer and a screwdriver can be useful.

Learn to make all of your bends precisely the first time. Rebending to remedy "goofs" almost always results in wire failure. Always allow enough extra wire to permit remaking parts, if necessary, especially if more than one item of exactly the same size is needed.

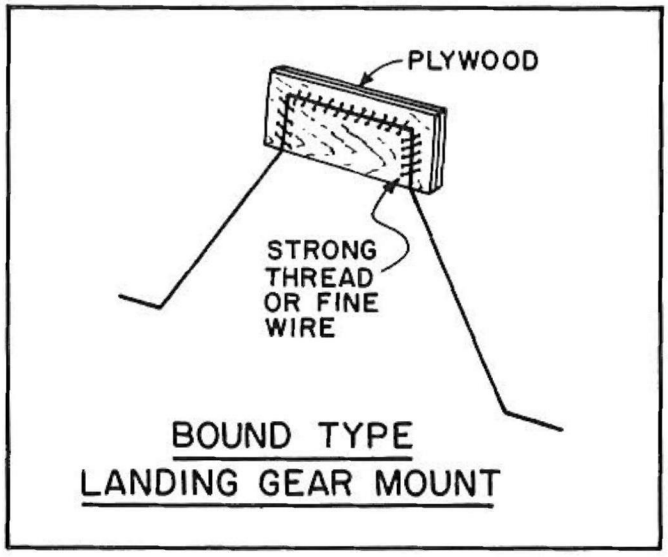


FORMING A CONTROL-LINE PUSHROD

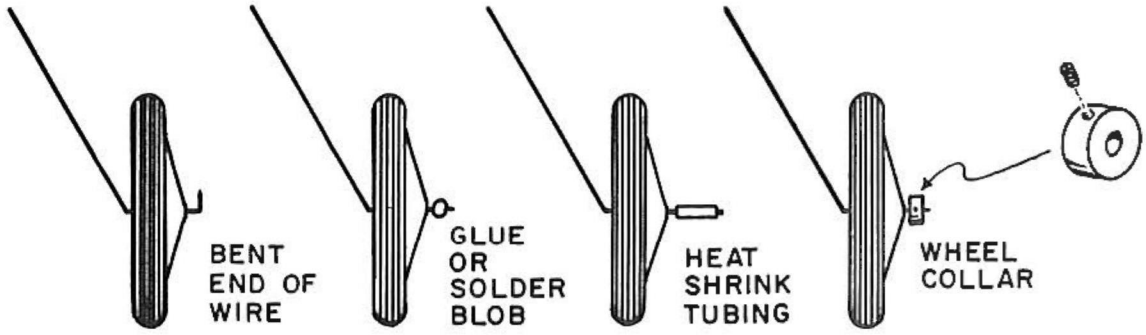




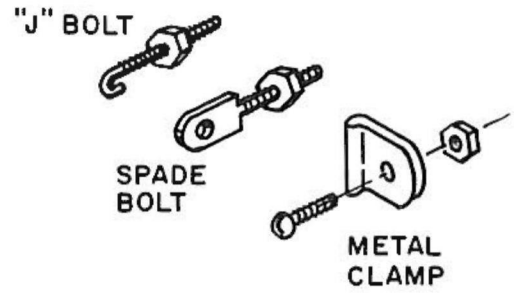
LANDING GEAR
"SANDWICH" MOUNT



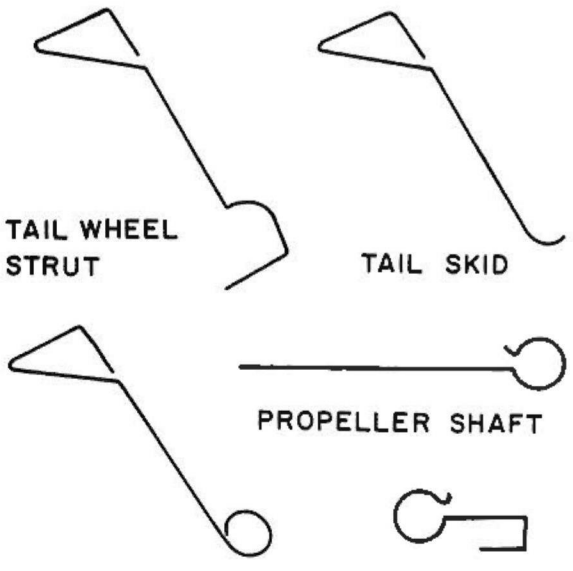
BOUND TYPE
LANDING GEAR MOUNT



WHEEL RETAINING METHODS



HARDWARE FOR ATTACHING LANDING GEAR WIRE TO BULKHEAD



Cutting wire: The old adage "measure twice and cut once" is very apt here. Nothing can be more discouraging than to cut the axle ends on some hard-to-form landing gear too short to accept the wheels! Diagonal cutters may be used to cut small diameter wire. Best practice is to insert the wire deeply into the cutting jaws wherever practical. Trying to cut large diameter wire with diagonals is almost certain to damage the cutting edges, or perhaps even break them. For the larger wire sizes, heavy-duty cutters are best. Alternatively, heavy wire may be cut by filing a groove completely around the wire, then breaking off by holding with two pairs of pliers placed closely alongside the scored line. After cutting any wire, it is a good idea to deburr the edge, since sharp finger-stabbing projections may remain. A few strokes of a fine file will provide safer edges and improve appearance as well.

Attaching wire parts: Wire parts must be correctly attached to the aircraft structure if they are to function properly. If their shock loads are not spread over a fairly large area, they may tear out in the event of sudden distress. Landing gear legs are the most common example of this, but other wire parts may be secured in similar fashions. For small models, a simple wooden "sandwich" will often do the trick.

The sandwich can be made of hard balsa, but on larger models, plywood is preferred. Be generous with the application of glue. An alternative system is to sew the landing gear wire in place with strong thread or fine wire, through holes drilled in the mounting wood. Again, glue is applied liberally to help bond the entire assembly. In some cases, glue-soaked cloth may be used to secure wire in position.

For very large and/or heavy models, strong mechanical fasteners are available. These consist of J bolts, spade bolts, or metal clamps. Tail-wheels or skids may be secured to the fuselage in any of the manners described. Needless to say, the wooden mounting plates must be firmly attached to the remainder of the fuselage structure. Small triangular gussets are useful in reinforcing intersections.

While on the subject of landing gears, perhaps we should touch upon wheel retaining. For very tiny models such as indoor or Peanut Scale types, wheels can be held on with a tiny drop of glue. Note that the wire must be perfectly clean, and that Ambroid or epoxy is most apt to hold firmly. Or one can simply bend the end of the landing gear wire up to retain the wheel. This is often not as easy as it sounds, however, as it is possible to cause either a binding wheel or one with too much side play if the bends are not made very accurately.

A system suggested by Frank Scott involves the use of heat shrinkable tubing, obtainable from RC model suppliers; has application to both small- and medium-size models. Wheels may also be retained by a small blob of solder, but the danger of damage to wooden or plastic wheels must be kept in mind. Commercially available wheel collars, which attach with set screws, work out well for medium-size or larger models.

By following these relatively simple guidelines, you should be rewarded with stronger, longer lasting models.

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SIG AAA AIRCRAFT BALSA

STICKS
36" Lengths

1/16 x 1/16	.05
1/16 x 1/8	.06
1/16 x 3/16	.07
1/16 x 1/4	.08
1/16 x 3/8	.11
1/16 x 1/2	.13
1/16 x 3/4	.17
1/16 x 1	.20
3/32 x 3/32	.07
3/32 x 3/16	.09
3/32 x 1/4	.10
3/32 x 3/8	.12
3/32 x 1/2	.16
3/32 x 3/4	.20
3/32 x 1	.24
1/8 x 1/8	.08
1/8 x 3/16	.10
1/8 x 1/4	.12
1/8 x 3/8	.15
1/8 x 1/2	.18
1/8 x 3/4	.22
1/8 x 1	.26
3/16 x 3/16	.11
3/16 x 1/4	.14
3/16 x 3/8	.16
3/16 x 1/2	.22
3/16 x 3/4	.27
3/16 x 1	.30
1/4 x 1/4	.17
1/4 x 3/8	.21
1/4 x 1/2	.23
1/4 x 3/4	.30
1/4 x 1	.37
5/16 x 5/16	.21
5/16 x 3/8	.27
5/16 x 1/2	.32
5/16 x 5/8	.38
5/16 x 1	.44
3/8 x 3/8	.27
3/8 x 1/2	.32
3/8 x 3/4	.40
3/8 x 1	.48
1/2 x 1/2	.36
1/2 x 3/4	.48
1/2 x 1	.60
5/8 x 5/8	.43
5/8 x 1	.68
3/4 x 3/4	.58
3/4 x 1	.75

48" Lengths

1/8 x 1/8	.11
1/8 x 1/4	.16
1/8 x 1/2	.24
3/16 x 3/16	.15
3/16 x 1/2	.30
3/16 x 3/4	.36
1/4 x 1/4	.24
1/4 x 1/2	.32
1/4 x 3/4	.42
5/16 x 5/16	.28
3/8 x 3/8	.36
3/8 x 1/2	.42
3/8 x 3/4	.54
1/2 x 1/2	.48
1/2 x 3/4	.64

SHEETS
36" Lengths

1/32 x 2	.32
1/16 x 2	.35
3/32 x 2	.40
1/8 x 2	.45
3/16 x 2	.55
1/4 x 2	.70
3/8 x 2	.80
1/32 x 3	.39
1/16 x 3	.44
1/20 x 3	.42
3/32 x 3	.54
1/8 x 3	.62
5/32 x 3	.68
3/16 x 3	.75
1/4 x 3	.87
5/16 x 3	1.00
3/8 x 3	1.12
1/32 x 4	.65
1/16 x 4	.70
3/32 x 4	.80
1/8 x 4	.92
3/16 x 4	1.05
1/4 x 4	1.22
3/8 x 4	1.60
1/32 x 6	1.20
1/16 x 6	1.30
3/32 x 6	1.45
1/8 x 6	1.60
3/16 x 6	1.85
1/4 x 6	2.25
3/8 x 6	2.75

48" AAA Sheets

1/32 x 3	.59
1/16 x 3	.60
3/32 x 3	.72
1/8 x 3	.84
3/16 x 3	1.00
1/4 x 3	1.19
3/8 x 3	1.49
1/16 x 4	.95
3/32 x 4	1.10
1/8 x 4	1.25
3/16 x 4	1.40
1/4 x 4	1.73
3/8 x 4	2.13
1/16 x 6	1.75
3/32 x 6	2.10
1/8 x 6	2.25
3/16 x 6	2.60
1/4 x 6	3.45
3/8 x 6	3.90

BULK BALSA - 3" x 36"
Not Stamped or Sorted
Sold Only in Std Packs
Std Packs in ( )

1/32 x 3(50)	.30
1/16 x 3(50)	.32
3/32 x 3(35)	.38
1/8 x 3 (25)	.46
3/16 x 3(20)	.54
1/4 x 3 (20)	.70
3/8 x 3 (15)	.87

BAGS OF BALSA
Bags of Balsa 1.19

BLOCKS
3" Lengths

1 x 1	.08
1 x 2	.16
2 x 2	.22
1 x 3	.22
2 x 3	.29
3 x 3	.46

BLOCKS
6" Lengths

1 x 1	.17
1/2 x 2	.20
3/4 x 2	.24
1 x 2	.30
1-1/2 x 2	.37
2 x 2	.41
1/2 x 3	.27
3/4 x 3	.38
1 x 3	.43
1-1/2 x 3	.51
2 x 3	.56
3 x 3	.83
1/2 x 4	.40
3/4 x 4	.47
1 x 4	.54
1-1/2 x 4	.69
2 x 4	.81
3 x 4	1.19
1/2 x 6	.60
3/4 x 6	.75
1 x 6	.88
1-1/2 x 6	1.05
2 x 6	1.15
3 x 6	1.90

BLOCKS
12" Lengths

1 x 1	.30
1/2 x 2	.38
3/4 x 2	.48
1 x 2	.56
1-1/2 x 2	.67
2 x 2	.79
1/2 x 3	.51
3/4 x 3	.65
1 x 3	.79
1-1/2 x 3	.96
2 x 3	1.18
3 x 3	1.79
1/2 x 4	.79
3/4 x 4	.90
1 x 4	1.05
1-1/2 x 4	1.30
2 x 4	1.59
3 x 4	2.38
1/2 x 6	1.15
3/4 x 6	1.45
1 x 6	1.55
1-1/2 x 6	2.10
2 x 6	2.40
3 x 6	3.50

36" BALSA
TRIANGULAR CUT

1/4 x 1/4	.20
3/8 x 3/8	.25
1/2 x 1/2	.30
3/4 x 3/4	.40
1 x 1	.55

BLOCKS
18" Lengths

1 x 1	.42
1 x 2	.85
2 x 2	1.18
1 x 3	1.20
2 x 3	1.75
3 x 3	2.60
1 x 4	1.50
2 x 4	2.35
3 x 4	3.45
1 x 6	2.35
2 x 6	3.50
3 x 6	5.10

BLOCKS
24" Lengths

1 x 1	.58
1 x 2	1.12
2 x 2	1.60
1 x 3	1.60
2 x 3	2.35
3 x 3	3.55
1 x 4	2.20
2 x 4	3.15
3 x 4	4.50
1 x 6	3.10
2 x 6	4.60
3 x 6	6.90

LEADING EDGE
36" Lengths

3/8 x 1/2	.35
1/2 x 1/2	.42
3/4 x 3/4	.64
1 x 1	.87

ROUNDED EDGE
AILERON & ELEVATOR STOCK

1/4 x 1	.55
3/8 x 1	.65
1/4 x 2	.75
3/8 x 2	.85

36" TAPERED TRAILING EDGE

1/8 x 1/2	.23
3/16 x 3/4	.27
1/4 x 1	.35
5/16 x 1-1/4	.45
3/8 x 1-1/2	.50

AIRFOIL SHAPED SHEETS

3/16 x 3 x 36	.86
1/4 x 3 x 36	.95
1/4 x 4 x 36	1.28

36" TAPERED CUT SHEET
Tapered to 1/16" Edge

1/4 x 3	1.00
1/4 x 4	1.30

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Packages .79

PLANKS
36" Lengths

1 x 1	.80
1/2 x 2	1.15
3/4 x 2	1.45
1 x 2	1.68
1-1/2 x 2	1.95
2 x 2	2.30
1/2 x 3	1.40
3/4 x 3	1.88
1 x 3	2.30
1-1/2 x 3	2.78
2 x 3	3.25
3 x 3	4.95
1/2 x 4	2.30
3/4 x 4	2.50
1 x 4	2.85
1-1/2 x 4	3.65
2 x 4	4.45
3 x 4	6.60
1/2 x 6	3.00
3/4 x 6	3.65
1 x 6	4.45
1-1/2 x 6	5.65
2 x 6	6.60
3 x 6	10.00

CONTEST BALSA
4-6 Lb Stock
Very Light

1/32 x 3	.47
1/16 x 3	.49
3/32 x 3	.61
1/8 x 3	.70
3/16 x 3	.85
1/4 x 3	.95
3/8 x 3	1.17

C-GRAIN AAA
8-12 Lbs.

1/32 x 2	.37
1/16 x 2	.40
3/32 x 2	.45
1/8 x 2	.50
3/16 x 2	.60
1/4 x 2	.75
3/8 x 2	.85
1/32 x 3	.45
1/16 x 3	.49
3/32 x 3	.59
1/8 x 3	.68
3/16 x 3	.83
1/4 x 3	.95
3/8 x 3	1.15

VH - VERY HARD

1/16 x 3	.49
3/32 x 3	.59
1/8 x 3	.68
3/16 x 3	.83
1/4 x 3	.95
3/8 x 3	1.15

KWICK-SET EPOXY GLUE
SETS UP IN FIVE MINUTES

2 Oz. . . . $1.59
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FUEL PROOF

FLEXIBLE

STRONG

QUICK

Specially Formulated For Model Airplane Construction And Repair

Epoxy Glue should be used anyplace that extra strength is needed, such as firewalls, engine bearers, landing gear mounts, and the interior of the engine compartment. Sig Kwick-Set is also very voluable for field repairs as it gives an extremely strong bond in just five minutes. It should be in every modeler's field box.

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SIG EPOXY IS EASY TO USE. Just squeeze out three equal puddles, mix and use. Pot life is approximately 15 minutes. The resulting bond is the strongest you can make. Use for firewalls, in the engine compartment, landing gear mounts, etc.

1½ Oz. Set 89¢ - 3 Oz. Set $1.49

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DOPE PROOF!

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2 Oz. Tube - 35¢ 4 Oz. Tube - 60¢

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ROCKETRY REVIEW

Photos by Estes and Centuri

JAM has published a long series of rocketry articles, covering in detail, all aspects of the subject. For the benefit of newcomers—or those who need to 'put it all together'—we present a summary of this popular hobby. / by Paul Kugler

Model rockets are easy to build. Even a six-year-old child can do an excellent job completely building a model rocket with some help in understanding instructions. Of course, a simple beginner's model should be selected for these important first attempts. With a little help, a small child can also do the actual launching of the rocket. (Editor: The average age of a rocketeer is 14-16.) This is important in stimulating and maintaining interest. Even adults get a thrill from watching a model rocket launched into the sky, observing the trailing smoke at the highest altitude attained, and watching the parachute or streamer bring the model safely to earth. Even the simplest beginner's model can reach altitudes of close to 1000 feet, so beginners do not sacrifice performance.

On the other hand, model rockets also offer much for the experienced modeler. The same skills and techniques that make for championship scale airplane modeling also apply to model rockets. If you are willing to put in the time and care that is required, you can duplicate actual rockets such as the Saturn V in the picture. Except for the narrow stream of the exhaust, there is really no way to distinguish this model from the real thing. On the launching pad everything moves so quickly that the exhaust and noise seem to be real. Whatever your skill level, you can find something that you like in model rocketry. And model rocketry is completely safe, even for the most inexperienced person. Simply follow the directions provided.

Parts of a Model Rocket: Regardless of the level of difficulty in building a rocket, each rocket is usually made up of the same parts. The basic component is the body tube usually made from a light, thin paper cylinder. All the other parts are either attached to this cylinder, or are carried inside the tube.

At the front end of the rocket is the nose cone. This part gives the model rocket its pointy nose, and helps direct the airflow smoothly around the body tube. The nose cone also keeps the front of the body tube sealed to hold in all the internal parts.

At the rear of the rocket are the fins, or stabilizer fins. They keep the rocket flying in a straight line once it is launched. Fins are usually made from some light material such as balsa sheet or plastic; it is desirable to have most of the weight up front.

The launch lug is the last exterior part of the rocket. This is a small tube, similar to a drinking straw, used to hold the rocket in line with the launching rod. The launch lug is also used to guide the rocket along the launch rod until the rocket has sufficient airspeed to make the fins effective. In most cases the launch lug is simply glued to the side of the rocket. With the above parts we complete the outside of the model rocket.

The main internal component of a model rocket is the engine. Model rocket engines are made for safe operation by several manufacturers. They are used once and then thrown away. A modeler should *never* attempt to reload a model rocket engine. Engines come in many different power ranges and exterior sizes. (The illustration shows how each engine is coded.) Once you know the code you can compute how high your rocket will go using different engine sizes. The model rocket engine is located at the rear of the rocket under the fins. The engine should be electrically ignited using a battery launcher kit.

The rocket engine works much like a real rocket engine, pushing the rocket into the sky. It also sends a charge up into the tube of the model rocket which ejects the parachute or streamer. This reverse firing is timed so the parachute ejects when the rocket has completed its climb to the maximum altitude.

Moving our attention toward the front of the model rocket, we observe a thrust ring. This is simply a paper ring that is glued to the inside of the body tube. The purpose of this ring is to provide a seat for the engine to push against when the engine is ignited.

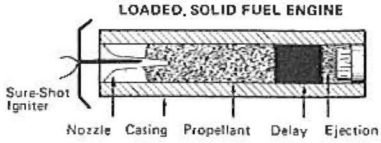
Moving forward along the inside of the body tube, we next observe flame-proof wadding. This material protects the parachute or streamer against the heat of the ejection charge

Top: Building the model rocket is an important part of America's fast-growing hobby. A youngster glues a fin onto his model rocket. Above: A two-staged Centuri Centaur is shown here just before launch. The black upper portion is a payload section that may be used to carry biological specimens. . .such as insects. The rocketeers are actually about 15 feet away from the launch pad.

Above: 5. . . .4. . . .3. . . .2. . . .1 LIFT OFF! A Saturn V begins its flight into the skies. Below: Rocketeers prepare parachute for insertion in nosecone of Saturn V. Below right: Model rocket kits are available in all levels of sophistication. The Saturn V is an exact 1/100th scale replica of the actual spacecraft and demands careful attention to detail from the rocketeer who is building it. Opposite page: The Saturn V exact scale model rocket in flight. Looks real!

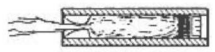
HOW DO ENGINES WORK?

SAFE, INEXPENSIVE, FACTORY LOADED, SOLID FUEL ENGINE

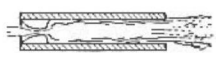


Battery operated launch system heats igniter in engine nozzle, starts propellant burning.

Engine develops pre-determined thrust. Action and Reaction principle causes rocket lift off.

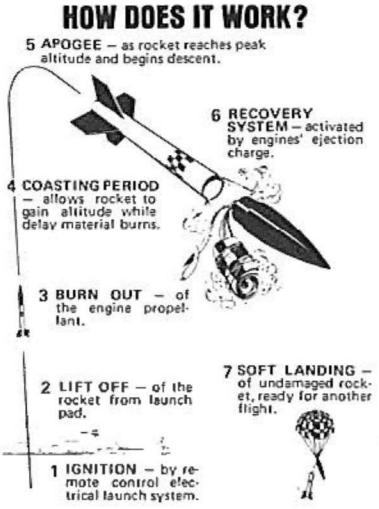


Propellant burns out, delay charge burns slowly permitting rocket to coast to peak altitude. Produces dense white smoke for ease of tracking.



Ejection charge ignites, providing hot, expanding gas to activate recovery system.

HOW DOES IT WORK?



HOW TO SELECT ENGINES

Model rocket engines are available in a wide variety of power ratings, each for a purpose. Use only the engines recommended for your model rocket.

TYPICAL ENGINE CODING

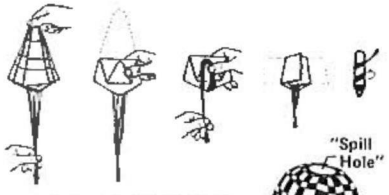
2 DELAY CODE
Has nothing to do with power. This number indicates, in seconds, time between engine burnout and recovery system deployment.

5 AVERAGE THRUST CODE
Amount of force (newtons) per second.

A TOTAL THRUST CODE
Total "power" rated in newton-seconds. Each class (letter) is twice as powerful as previous class (example "B" engine equals 2 "A" engines).

PARACHUTE TIPS:

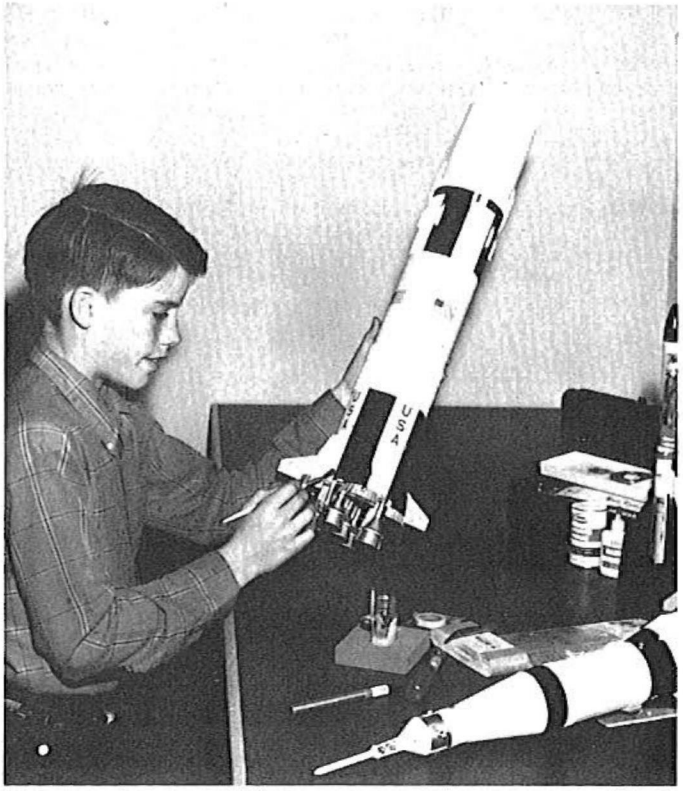
Fold chute tightly to allow for smooth ejection. Pack chute just before launch!

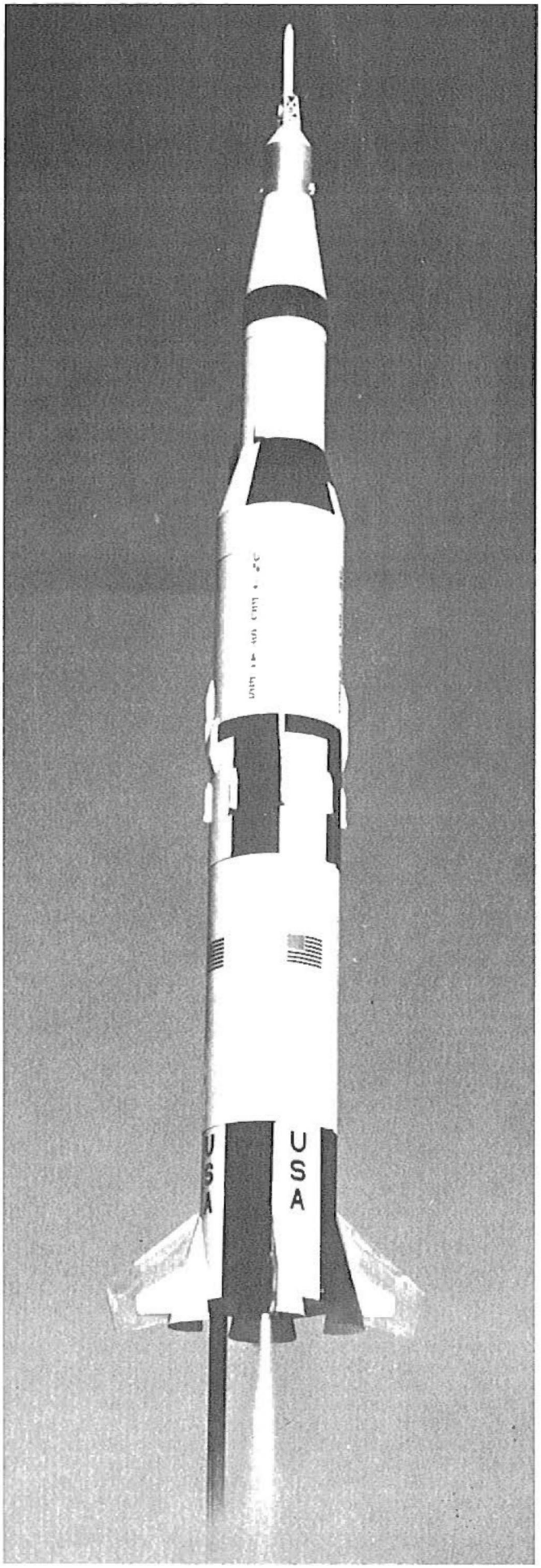


Cut a small "spill hole" in chutes for launching in breezes, or to extremely high altitudes, to enable recovery within a reasonable distance.

ALWAYS use the recommended Flameproof Parachute Wadding to prevent hot ejection gases from melting the parachute!

Fly model rockets only with the engine types recommended for the specific kit. Flying with non-recommended engines may result in torn-off fins, ripped parachutes, unstable rockets, and a host of other problems.





that the engine fires to expel the parachute; it also acts as a piston to force all of the interior parts of the rocket forward of the engine out of the body tube when the engine retrofires.

The parachute is found in the interior of the body tube. Usually the parachute or streamer is attached to the nose cone together with a shock cord—a long strand of elastic.

When the engine retrofires the flameproof wadding moves forward pushing everything out of the body tube. The parts are thrown out of the body tube with great force. The shock cord absorbs the shock that the nose cone makes, and at the same time the parachute or streamer is pushed out into the airstream. Once the parachute is deployed at maximum altitude, the rocket slows and floats to the ground. At this point the rocket is ready for another flight. Simply insert another engine, replace the flameproof wadding, fold up the parachute and you are ready to launch.

Types of Rockets: There are five basic types of model rockets. First is the single-stage rocket. These simple rockets may be studied by the beginning modeler learning how to construct rockets, how to launch the completed rocket, and how the recovery system works.

Another type of model rocket is the multi-stage rocket. These rockets make extremely high altitude flights through the coupling together of single engines. Multi-stage rockets may serve to illustrate to the model rocketeer stage coupling techniques, booster separation, and upper stage ignition. The Junior modeler should not attempt to build these rockets until he is thoroughly familiar with the principles and operations of single-stage rockets.

Payload rockets are those which carry an extra weight. This kind of model rocket may carry an egg or an insect to teach the Junior modeler the effects of acceleration and payload handling. One of the techniques used in this type of model rocket is the clustering of engines—several engines fire at the same time to lift a greater weight.

We are all familiar with scale model rockets. To do a good job one must be prepared to spend a considerable amount of time building one rocket. However, as you attempt to build a scale model rocket you will find that your skills will improve. The scale modeler is always seeking new techniques and materials, and attempting to improve his skill to make each new rocket more scale-like than the one before.

Lastly, we have rocket gliders. These rockets are actually gliders that use the rocket engine to reach a high altitude. Once the rocket glider reaches its highest altitude, the rocket engine often ejects, and the modeler then has a pure glider that behaves just like any hand- or catapult-launched glider. This type of rocket combines the model airplane and model rocket hobbies.

Model Rocket Engines: The modern model rocket engine is really a triumph of technology. Years ago, many people were hurt trying to make model rocket engines—they ended up building bombs instead of engines. Model rocket engines today are completely safe when used as directed. The engine is one part of the model rocket that should always be purchased. Never attempt to build your own.

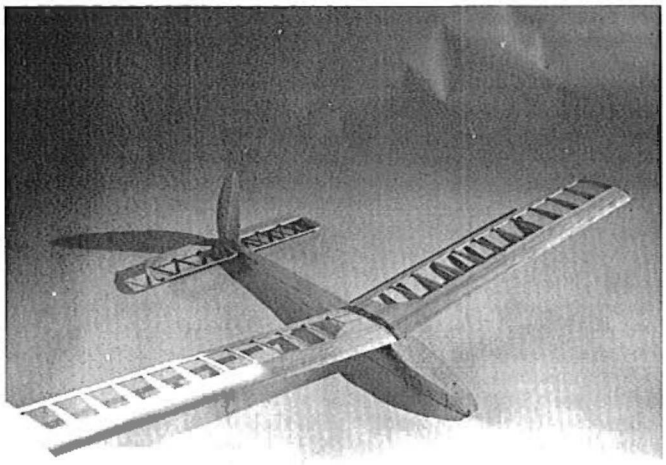
Model rocket engines have five basic parts. The ceramic nozzle determines the way that the pressure from the burning propellant is released into the air, and should never be altered. Also, the ceramic nozzle is the place where the nichrome igniter wire is inserted into the engine to ignite the propellant. The amount and type of the propellant determines how high your rocket will go and how quickly your model rocket will accelerate. After the solid propellant burns, it ignites the delay charge. This provides no thrust to the rocket; instead it is a delay that lets the model rocket get to the top altitude it will attain.

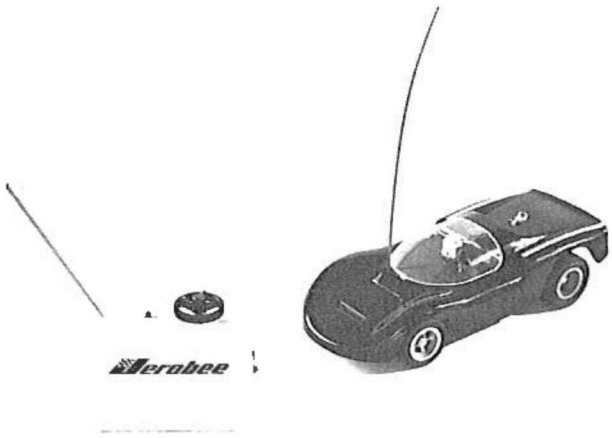
Once the delay charge has burned through, the ejection charge is ignited. This charge will pressurize the engine body of the rocket forcing out the nose cone and the parachute. If the engine is not fastened securely into the body tube, the engine may eject itself rather than the parachute. This will often cause the loss of the rocket. The last part of the model rocket engine is the tube which holds the nozzle and the propellant.

Using the correct types of engines in properly designed model rockets, the model rocketeer can attach two or more stages together to push his rocket to extremely high alti-

(Continued on page 58)

new products





Airtronics Questor: Some time ago Paul Runge of Ace Radio Control was talking to me and asked, "Have you seen the Questor fly?" When I answered, "No," he told me that his son had been having a ball flying the Questor using the ACE Stomper rudder-only RC unit. He suggested that I do a test on the Questor for JAM readers. That suggestion was good advice.

The Questor is a high-performance RC sailplane. It has a 62-in. wingspan with a wing area of 409 sq. in. The flying weight is under 20 oz., which makes the Questor perfect for thermal flying. It will also do just fine on the slopes. For this test we built the Questor as a pure glider with no power pod, however a power pod is available as an extra cost option. I prefer to fly gliders without any attachments that detract from performance.

Either single-channel pulse proportional, such as the ACE rudder-only system, or the smaller two-channel RC unit can be used with this glider. The plans and instructions do show all possible installations. With either control system you can expect long soaring flights, especially on a day with good thermal activity.

The material provided in this complete kit is of high quality. Everything was cut perfectly and fit exactly the first time without any adjustments. The kit comes with plans and two booklets of instructions. The building instructions are an education by themselves, and are so good and clear that I believe that almost anyone could build the Questor without very much previous modeling experience. Not only do they tell you what needs to be done, but they also tell you why. Most modelers will find the building process an educational experience that will help them in building future models,

The Questor comes complete except for the radio and finishing materials. The accessories that they include could easily cost several dollars if purchased separately. For more information write to Airtronics, P. O. Box 132, Sierra Madre, Calif. 91024. The Questor costs $26.95.

Jerobee Commando Kit RC Car: Radio Control modeling gives many hobbyists much pleasure. When it comes to car modeling and racing, radio control makes the hobby very exciting. It is the only practical way that I know of where the modeler can be competitive with his friends, with the outcome determined by skill. Yet, the modeler must be aware that any type of radio control must, by the very nature of the equipment, be relatively expensive.

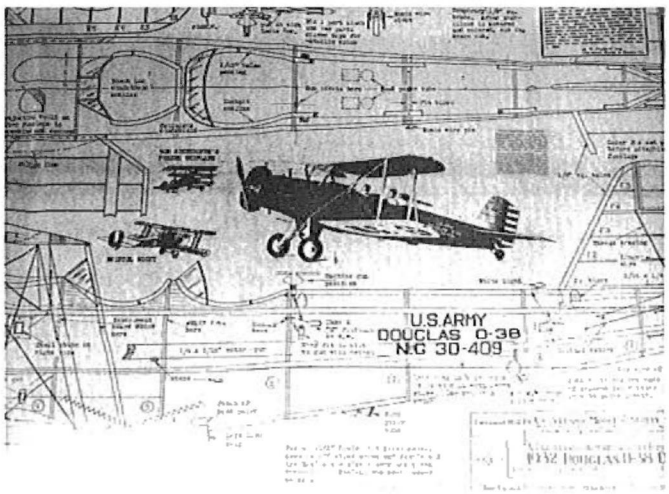
Jerobee Industries has recognized the financial problem that Junior modelers have. They have introduced the Jerobee kit which retails for considerably less than the completely assembled Jerobee outfit. Assembly is simple, and can be accomplished in about three hours. This is actual time including the time needed for reading instructions and identifying parts. I am sure that the second time around you could do the entire assembly in about 15 min. I do recommend that whenever you build any expensive item that you read and re-read all of the instructions carefully. The Jerobee instructions are clear and complete.

Once you have built the car kit, including installation of the two-channel radio, you are in for the thrill of your life. These 1/12-scale race cars move at speeds exceeding 25 mph. That's fast! Both the car and the radio receiver are tough. Without any pre-planning I proceeded to test the toughness of the car and radio by running at full speed into a curb. I learned two things from this experience. First, the car and radio are stronger than expected. Second, learn to drive the Jerobee at slow speeds before you think that you can operate it at top speed.

The radio-control unit has many features. It is fully proportional, with control of both the front wheels and the engine speed. It is of brick-type construction so it can mount into any chassis. No FCC license is needed. The transmitter has a fine trim for the steering control.

The Jerobee Commando kit is highly recommended as a fine way to get started in RC car racing; See your model dealer, or order the Commando kit from Jerobee Industries, Inc., 12702A N. E. 124th St., Kirkland, Wash. 98033. Price is $100.95.

PAUL KUGLER

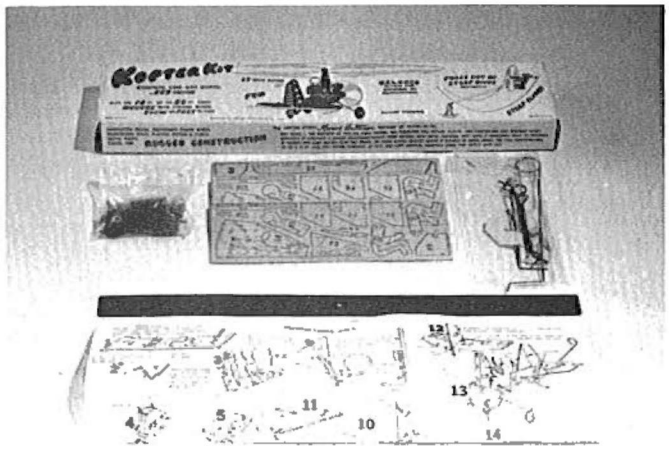


Cleveland Plans and Kits: When I was a boy, the name Cleveland in model building was associated with the best in kits and quality construction. I can remember building several of their kits long ago. One day while looking through JAM, I noticed their advertisement. For only fifty cents one gets a catalog subscription for a year. I was pleasantly surprised when the catalog arrived in the mail, and I saw a tremendous variety of plans available. Some of the original kits are still available, too.

Since 1919, Cleveland Model and Supply Co. has been a pioneer of authentic scale modeling. Many of the plans that they have are more than just plans from which to build model airplanes. They are really historical documents. By and large, the plans are excellent for building flying-scale models. I ordered several plans which provided me with a sampling of the entire Cleveland line. The easiest model to build is an ROG (rise-off-ground) Cleveland Wasp. This is a simple model with an airfoil wing and one-piece straight stick fuselage. The second model has always held an attraction for me. This is the Cleveland High Climb 24" Twin.

The Twin is a canard (the wing is in the back) that has an A frame fuselage with twin-pusher propellers. You have seen pictures of this model at many Old-Timer events. The third plane was for the Cleveland Flying Dutchman, a high performance rubber-powered model that can either rise off ground or water. The last plan was really great. This is the 1932 Douglas 0-38 Observation Plane. This Cleveland-designed model aircraft is really superdetailed.

If you are like me, I think you will enjoy just sending for the Cleveland catalog. It has drawings and pictures of just about every airplane built since 1909. Ask your grandfather or father about Cleveland plans and kits. Send 50 cents for a catalog to Cleveland Model and Supply Co., 10307 Detroit Ave., Cleveland, Ohio 44102.

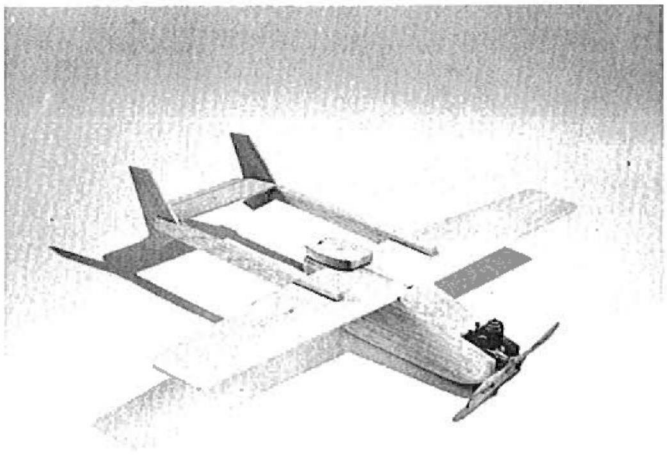


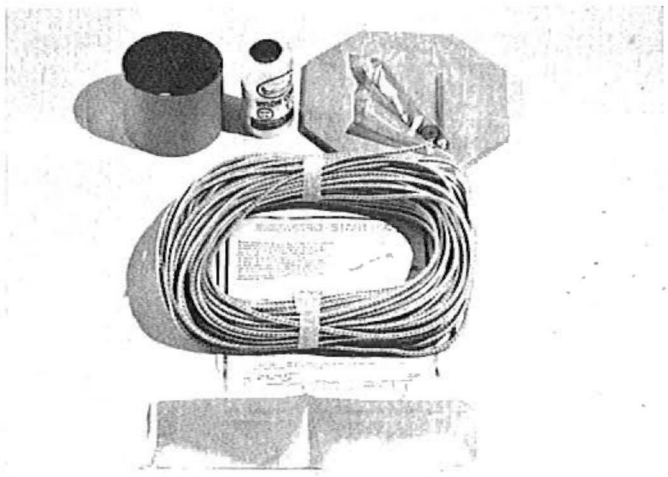
Kopter Kits: When I opened the box for this kit, I saw a most unusual 049-powered control line model—completely different from any I had ever seen. This model has no wings! That is not unusual for a helicopter, you might say, but I ask, "How does a control line model fly without wings?" Most models of this kind usually disguise wings in some way so they are not visible from the side. The Kopter Kit really has no wings at all. It does have a 17-in. plastic rotor that serves the purpose of a wing, but this is exactly what a helicopter does. All in all, this is a unique model.

The Kopter Kit has few parts, and these are all excellently die-cut out of good quality balsa. Each part, in addition to being die-cut, is also printed on the wood, so there is no problem of identifying which part is which. The kit is complete; all you need is glue and dope. The wire parts are bent to the exact shape needed for final assembly. (This is one of the things that I have trouble with when I am building a model so I welcome this feature.) The building instructions are clear, with each step of the assembly process illustrated by a line drawing.

Fly your Kopter Kit on 25-ft. dacron lines to start. Your first few flights should be on a day with no breeze. I recommend that you do not fly in the wind until you have had some experience flying this model. You can adjust the flying speed from slow to fast by adjusting the angle of the roter. As a beginner you will initially want to set the flying speed to the slow area. The Kopter Kit will dive, climb, hover into winds, and once you gain experience, even do loops on 50-ft. lines.

For a new experience, give the Kopter Kit a try. If your hobby shop does not have this kit in stock, order it direct from Kopter Kit Co., Box 607, Saddle Brook, N.J. 07662. The price is $6.95 plus 50 cents for shipping when ordered by mail.





Masco Cessna Skymaster: Have you wanted to fly twin-engine control line? Do you want something completely different from the other models down at the schoolyard flying site? Something that is easy to build, yet looks sharp? The Masco Cessna Skymaster is a newly released model for the ½A control line fan. Although this model is different in appearance, careful engineering makes it simple to operate and fly. The Skymaster is so well engineered that even the most inexperienced modeler can construct and fly it. The kit has all parts sawed to shape so no cutting out of parts is required.

You must decide at the time you begin construction whether you want the model to be a single- or twin-engine configuration. It will fly equally well in either version. The kit includes both a parts sheet and picture building instructions. As the first step I took each of the parts and identified them from the parts sheet. As each part was identified, I marked it with a ball point pen, taking care to press lightly. Once this was completed, I began construction. Prior to construction you will want to purchase Hobbypoxy Formula 4, as this is the recommended glue for assembly.

The building instructions are excellent. The instructions are essentially a series of 18 photographs accompanied by written instructions. The only place I would recommend that you do not follow the plans is in the drilling of the engine mounting of the engine(s). I followed the instructions and had a hard time actually installing the single engine. It is much easier to do the drilling and mounting on the firewall before it is installed in the fuselage.

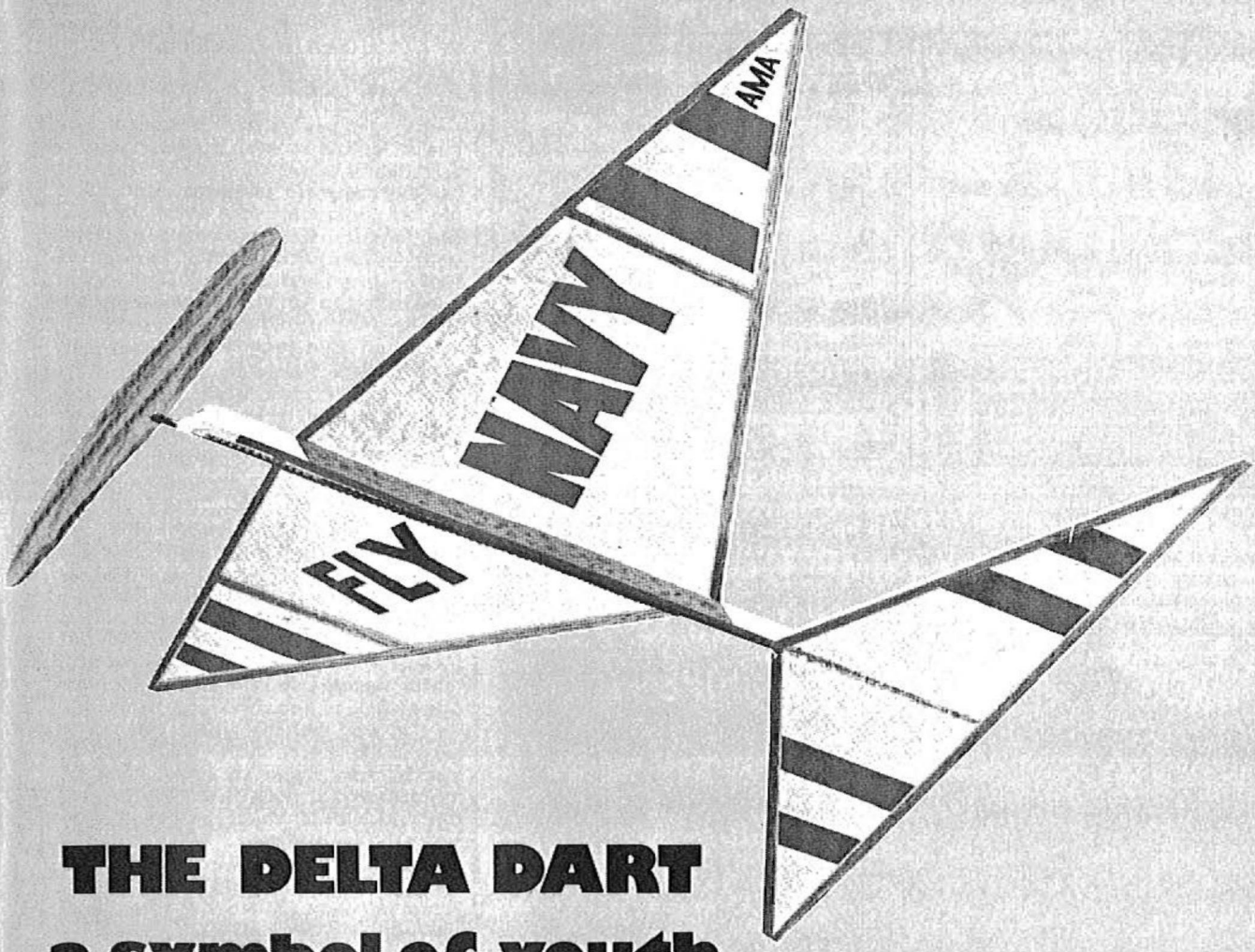
Be different, try the Masco Cessna Skymaster. The price is $5.95, and the model can be purchased at your hobby shop or directly from Masco, P.O. Box 26412, Houston, Tex. 77032.

Astro-Start: In building the Questor sailplane I had to ask myself how I planned to get the airplane up into thermal activity. I had three real choices. First, attach a power pod. I have done this many times in the past, but it is the least desirable option for me. It hurts performance both by adding additional drag and by adding more weight. Using an engine also means carrying fuel, batteries, and all other needed items. This option means that I lose many of the advantages of flying a glider. The second option was to hand tow. I have done this many times with my models. This method works well and preserves the advantage of a glider. One disadvantage of this method is that one must have strong legs, and good endurance. Maybe some years ago this was a good method for me, but all of these advantages can be found in the third option without any disadvantages.

The way that I now prefer to launch gliders is by using a hi-start. Astro-Flight, Inc. makes an excellent hi-start called the Astro-start. The Astro-start consists of an exerciser cord which stretches and provides the power, a long nylon line to which the low ring and model are attached, and a storage handle device. This launching mechanism will launch a two- to five-lb. sailplane to an altitude of 200 meters. The Astro-start contains everything that you need to launch a glider.

Here is how the Astro-start works. The exerciser cord is tied to a post or tree or any other solid mounting. The glider is then hooked into the tow ring at the end of the nylon line. Once the exerciser cord and the nylon line are tight, pace off an additional 80 paces (240 ft.) stretching the exerciser cord in the process. Never exceed 100 paces (300 feet) or you can damage the cord. Point the nose of your model skyward and release. The force of the exerciser cord contracting, together with the lift of the model will take your airplane to 300 meters altitude. One caution, never allow anyone to stand alongside a hi-start while it is stretched as the exerciser cord delivers a lot of force as it contracts.

For information contact Astro Flight, Inc., 2301 Cheryl Pl., Los Angeles, Calif. 90049. The price is $34.95.



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WHAT'S YOUR QUESTION?

(Continued from page 8)

Speed is essentially like Speed except that models are timed from the point of release of the model. Model design requirements are such that no drop-off landing gears are permitted, and these models look more like their full-scale counterparts. Carrier aircraft must go both fast and slow. Points are awarded for top speed and for the difference between the top speed and the low speed. Points are also awarded for fidelity to actual full-scale aircraft that have flown from carriers.

Q: I am 12 years old and have been building balsa planes since I was six. My father has been building planes for a long time, too. When my father ordered a subscription to AAM, there were a lot of plans to buy. But I could never understand the magazine except "For the Tenderfoot." So I was glad when you came out with JAM because I think it's the best modeler magazine for kids. I have bought a few plans from JAM, but I can't find where to buy a Mabuchi motor for the Merrimac and Monitor plans.

Can you tell me where I can send away for one around my area? Can you also tell me where to get a Jetex 50 motor and, for the article "Fly Paper," can you tell me where can I send away for that kind of paper?

My father has been in the RC North Jersey Club and I would like to know if I can join also. Where can I get those AMA decals for my planes?

Joey Auevedo
Saddle Brook, N.J.

A: Joey, we are glad that you like JAM. I don't know where you can buy a Mabuchi Motor either. If someone will write to me and give me an address, I will forward it to you. You may want to substitute another electric motor for the Mabuchi. These are available from Dumas Products, Inc., 790 South Park Ave., Tucson, Ariz. 85719.

Jetex 50 motors are available from Polk's Hobbies, 314 Fifth Ave., New York, N.Y.

Your dad will have to tell you if you can join the North Jersey RC Club. AMA decals come free with AMA membership.

Q: Because I have lost free flight airplanes in the past, I want to put a Tatone fuel timer and a dethermalizer on the Midwest Products Sniffer I am now building. Can you tell me the way to hook up this timer to a Cox Pee Wee 020?

Marshall Vickers
Westland, Mich.

A: Marshall, welcome to the club! The last time I flew free flight without a dethermalizer was about two years ago when I lost three models in one week. Since then I have used the Tatone timer and Tatone D-T timer and have not lost a single model.

There are several ways to hook up the Tatone timer to the Cox Pee Wee

020. The most reliable way is to drill two holes in the side of the fuel tank. These holes should be slightly smaller than the fuel tubing provided with the Tatone timer. Take the tank off the rear of the engine and feed in the fuel tubing through one hole and force it onto the fuel pickup tubing inside the tank. Next, take the tank and replace it on the rear of the engine. Run the tubing on the outside of the engine through the second hole that you have drilled. This modification permits the timer to cut off the fuel flow between the tank and the engine.

The second method is simpler but less reliable. Take tight-fitting tubing and block off one end. Place the tubing over one of the filler nipples on the tank. This fitting must be air-tight. To the other filler nipple attach tight-fitting surgical tubing and run it down through the timer. When this is done the timer will stop the engine by cutting off the air flow into the tank, thereby creating a loss of air pressure that halts the flow of fuel from the tank into the engine.

The best alternative is to purchase a Cox engine with an external fuel line from the tank to the needle valve. Simply replace the fuel line that comes with the engine with the tubing that comes with the Tatone timer. Be sure the tubing passes through the timer. This requires no engine modification.

Q: My father and I are building the Beaver, a Sig RC model. We live near a nine-acre lake so we would like to put floats on the model, but we couldn't find any. So could you tell me where we can buy floats or obtain plans for them? I think JAM is a great magazine.

Bob Dellinger
Chagrin Falls, Ohio

A: To make sure that you would have the best information possible, I talked to Claude McCullough, Product Engineer for Sig Manufacturing Co. He recommends that you *not* put floats on the Sig Beaver. The Sig Beaver's 45-in. wingspan, together with its engine size of 049-15—depending on type of RC set used—makes it a rather heavily loaded model for the power available. You will find it is an excellent trainer or sport model with the standard landing gear. In addition, all available floats on the market today are too large for this model.

Bob, I would recommend that your first ROW model be one that is especially designed from scratch for this purpose. I know that the Du-Bro Products Sea Bird 600 is an excellent model for your purposes. However, this is an expensive model compared to the Beaver and requires a 40-60 engine. One factor to consider when selecting a model is not just the initial cost, but the real cost if the model will not do the task and your RC unit ends up on the bottom of the lake.

Slightly more expensive than the Sig Beaver is the Jetco Navigator. This model takes an 074-10 engine and is good using a single-channel RC set. However, this model is much more difficult to build than the Sig Beaver or the Sea Bird 600.

Q: In the July issue of JAM there is a piece on how to launch rockets. I understand everything except the part about nichrome. How do you make it and what does it do?

David Bowen
Chemung, N.Y.

A: Nichrome wire is inexpensive and is sold by the makers of model rocket engines. This is not an item that a modeler makes. The purpose of nichrome wire is to ignite the solid propellant charge in the rocket engine. Each package of three engines will contain either nichrome wire or an equivalent.

Here is how the process works: The model rocket engine is prepared for ignition by first inserting a nichrome igniter wire so that it passes through the ceramic nozzle and comes in contact with the propellant. When an electrical current from a battery passes through the wire, the nichrome wire will be heated red hot and ignite the propellant. The burning propellant creates tremendous pressures inside the engine. These pressures cause the rocket to move upward and lift off the pad.

STAINED GLASS WINDOW

(Continued from page 29)

employ white glue or Titebond which has been thinned slightly with water. The mixture must be used sparingly to avoid warping the wood. The more traditional method is to use clear dope as an adhesive. In this system, several coats of clear dope are applied to the framework. Then, the tissue may be applied by flowing thinner directly through it, which will soften the dope film enough to make it stick. A thin coat of clear is then applied over the top to seal down the edges. Note that only the top surfaces of the wing and elevator are covered, and only one side of the fin. The tissue should not be water shrunk, as warps would probably result. For an even greater resemblance to a stained glass window, thin strips of black tissue may be added between the different colors of tissue. This represents the lead used to separate and secure the glass in a real window.

Motor Stick: Select a stiff, straight section of 3/16 x 1/8" balsa, and cut it to the length shown. A scrap section of the same material is glued to the lower front end and trimmed to be a snug fit in a North Pacific "Skeeter" prop bearing assembly.

The rear rubber retaining hook is bent to shape from music wire, and attached to the rear of the stick with a few turns of thread and glue. Do not use an excess, or the resulting lump will prevent the wing from fitting properly against the stick.

Assembly: The little exploded view shows the relationship of the various parts. Pin or weight the wing center section to your building board, again using plastic wrap to protect the drawing. Apply glue to the outer wing panel joint areas, slide them into position against the center section, and prop up each tip 1" for dihedral. For best results, these joints should be allowed to dry overnight. After removing the assembly from the board, turn it over, and add some extra glue in the V slots at the dihedral joints. Caution: If too much glue is added, it may soften the original glue, and the wing panels may sag.

The motor stick may now be glued in its correct position, and the vertical tail (fin) added. Install the elevator directly against the fin lower side for incidence. The propeller bearing assembly is added last. It is worth spending a few extra minutes to balance the propeller, by sanding the heavy blade. Also, a small drop of oil applied to the shaft will reduce friction and wear.

Flying: A single loop of 3/32" wide rubber was used for power on the prototype. With the rubber motor installed the craft should balance at about the place shown on the plan. If not, add a small lump of modeling clay to either the tail or nose. Try a few hand glides, giving the model only a gentle shove in a slight nose-down attitude. If it dives, add weight to the tail. If this doesn't provide a cure, shorten the nose of the motor stick slightly, which will move the relatively heavy propeller assembly closer to the rear. If the model stalls or mushes, add clay to the nose. Wind in 75 or so turns, and launch the model gently (don't throw). It should begin to climb and perhaps turn slightly. If it turns too sharply, add clay to the opposite wing tip.

Increase the number of turns and if necessary readjust. It is also possible to make power turn adjustments by carefully bending the plastic propeller bearing assembly. Once the craft is performing properly, it may be fitted with a longer, lubed rubber motor, and winder wound. Properly constructed and adjusted, the model is a consistent and dependable flyer, which looks quite spectacular against the sky. (Editor's Note: If you don't have "lube" rub on sparingly a little bit of margarine.)

HOW TO COVER WITH SILKSPAN

(Continued from page 37)

be puckered and quite loose at this time—this is normal. Apply the dope quickly and liberally, making sure that the material does not lap over itself along the edges. As the Silkspan dries, it will shrink, become taut and be wrinkle free. If the dope turns white around the edges, don't worry. The first coat of finish dope will eliminate the white areas.

Finish the Silkspan by applying 3 or 4 coats of plasticized, diluted dope. Butyrate dope can be plasticized by adding about 4 drops of castor oil to each ounce of dope. The plasticized dope is then diluted with thinner: 2 parts dope to 1 part thinner. Plasticizing makes the dope more pliable and shiny. It will tend to reduce warping by limiting the shrinkage of the Silkspan with successive coats of dope.

That's all there is to it short of some practice. Three or four coats of dope (diluted and with castor oil added as mentioned above) with light sanding between coats will give you a shiny, air-tight surface. Trim may be added using colored Japanese tissue, MonoKote or colored dope. If you must use colored dope all over, use as few coats of color as possible—two coats of clear followed by two coats of colored dope should do for any sport model. A final coat of clear dope will make the surface shiny and more fireproof.

U-CONTROL YOUR RACE CAR

(Continued from page 22)

Racing can be very exciting if you have two cars with similar engines. You can even plan long distance races with pitstops. When the engine seems to be starving just stop the car and lay the wires on the ground so that your opponent can drive over them. When you are refueled and ready to go again, pick up the handle and continue racing. Passing the other car can be accomplished with care as long as you both cooperate. Remember, in motor racing there is no room for dirty playing!

Suggested parts for scratch-built car.
Front wheels and tires, from any toy car, about 2" diameter.
Cox Eagle, Wen-Mac Camaro, etc.
Rear tires, about 2¼" diameter, e.g. Jerobee Part No. K30006-101.
Rear Wheels, to fit rear axle, e.g. Jerobee K30004-101.
Rear Axle, Jerobee K30020-101.
Driven Gear, Jerobee D30227-101.
Engine with clutch and starter, 10-tooth gear, Jerobee D30244-301.
Bellcrank, the bigger the better, plastic or metal.
3/32" aluminum, phenolic or other suitable material for chassis.

THE DO'S AND DON'TS OF EPOXY

(Continued from page 17)

joint, can be used to make fillets to strengthen weak-looking joints. This will add a lot of strength to those place that take high loads or stresses. An epoxy joint is much stronger than one made with a regular model cement. A little dab of epoxy will hold things together in most cases, so your model will be a good bit lighter.

I don't want this article to look like a paid advertisement, but I must make one important point. Experts at Sig, and the Pettit Paint Co., the makers of Hobbypoxy, have sorted through all the different types of epoxies to select those which are best suited for hobby needs. There are many other brands found in drug, grocery and hardware stores—even hobby shops. These are meant to do all sorts of other things. Some might be okay for our use but you cannot be sure. Most become too hard and brittle when they are fully cured. Shocks from hard landings and vibration from running engines will cause them to shatter like glass. It is best to stay with epoxies we know are intended for our needs.

There even are differences between the epoxies sold by these two companies. Sig packages one type in three different sizes. Hobbypoxy sells three different types, two in one size each, with the third in two different packages. Hobbypoxy I and Sig are very similar and can be used for the same jobs—all around use and general construction with new wood. Hobbypoxy I hardens a bit faster than Sig but they are basically the same. Hobbypoxy 4 is the one in the two different packages—one is a group of premeasured packets handy for repairs in the field, the other is two tubes so that you can mix the size batch that you need. Hobbypoxy 4 is quite similar to the first two kinds and can be used like quick-drying model cement—if you are building something in a hurry. Hobbypoxy II comes in two large tubes, takes longer to cure, and is used when fiberglassing or applying a strong, hard finish as described in their "Easy-Does-It" method. It also is better to use for repairs around old epoxy joints because it sticks to other epoxies better than they do to themselves once they are hard. Hobbypoxy I becomes hard in 20-30 minutes, Sig in 45-60 minutes, Hobbypoxy II in 3-4 hours, and Hobbypoxy 4 in about 10 minutes. Choose from these for the job you want to do.

Epoxy is easy to use provided you follow directions. Hobbypoxy II must be mixed in a cup, etc., because batches are larger and much runnier. A Hobbypoxy Glue Knife or artist's palate knife are the best tools for applying it. The cup must be plain or unwaxed and clean, or the batch will become contaminated and not harden properly. The others should be mixed on a flat surface like an unwaxed paper plate, stirred and applied with a round wood toothpick. These are cheap and can be thrown away, the toothpick after each new batch and the plate after all the clean spots are used. The knives should be cleaned before the epoxy hardens with Hobbypoxy thinner, alcohol, or acetone. Do be careful to avoid getting the epoxy on your fingers or anyplace where you do not want it. It is just too difficult to remove once it hardens. Clean your hands with the solvents listed above and then wash thoroughly with soap and water. An application of a good hand lotion will counteract the drying action of the solvents.

Epoxy glues will make it much easier to build strong, durable and fuel-proof models. Try it, you'll like it! Before you do though, be sure to read and *understand* the directions. A bad batch makes an awful mess. Use it properly and you might end up like me, using nothing else.

FEARLESS FLY

(Continued from page 12)

When this assembly is dry, sand the planking to the contour of the airfoil; and, by sanding, remove the sharp edge from the leading and trailing edges. Add 1/2 ounce of weight to the outboard wing, near the leading edge. Glue it well.

The model now is ready to cover. This can be done with any of the known methods, but for economy, Silkspan is recommended. Cut two sheets of Silkspan the size of the wing, but about two inches wider and longer to allow for removing of wrinkles. Dope around the edge of the bottom of the wing and let dry. Wet one piece of Silkspan and cover the bottom, running another coat of dope around the edges. When this is dry, the excess can be cut off with a razor blade or sharp knife and the procedure repeated for the top of the wing.

After the covering is dry and trimmed, install the boom-stab assembly, aligning and glueing at the edge of the center planking. Then add the 1/8" sheet gussets for reinforcement.

Lay the model over the plan and mark the center line at the leading edge. Install the engine pod at this center line. The pod-wing joint is reinforced using Silkspan. If you are using a Cox .049, the tank will require some form of mounting arrangement and can easily be accomplished with wire hooks top and bottom, and a rubber band. The hook portion

for the rubber band must be bent after inserting the wire through the pod.

When this assembly is dry, install the pushrod into the stabilizer horn. Position the engine on the mount and mark the centers of the mounting screw holes. We used small roundhead wood screws for mounting the engine.

With two coats of clear dope and one of your favorite color, your Fearless Fly is ready for its first flight. Don't be surprised if it's quite maneuverable.

ROCKETRY REVIEW

(Continued from page 49)

tudes. One must use a booster engine as the first-stage engine. This type of engine does not contain an ejection charge. The booster engine is scotch taped to the ceramic nozzle end of a regular engine. Once the solid propellant burns through in the first-stage engine, a high pressure force is built up in the area between the engines. Hot particles from the first-stage engine will pass through the ceramic nozzle of the second-stage engine and ignite the solid propellant. The thrust force of the second-stage engine will force the first-stage engine to separate and drop off.

As we mentioned before, a technique called clustering is often used to launch heavy rockets. In this way the power and thrust of several engines is delivered at the same time, rather than sequentially. Clustering permits the lifting of large scale rockets that are too heavy to be launched by a single engine. The proper method of igniting all engines at the same time is thoroughly explained and illustrated in the Estes catalog. Rather than give you an incomplete description here, it is suggested that you study this portion of the catalog prior to attempting to launch a rocket with clustered engines.

Recovery Systems: The best known system for rocket recovery is that used by the full-scale rockets. This method is parachute recovery. There are four other methods that are used to recover model rockets. Depending on the type of model rocket launched, all of these recovery systems are effective. Both parachute and streamer recovery work the same way. The parachute or streamer provides a great deal of wind resistance. The resistance together with the light weight of the model rocket is sufficient to assure the slow return to earth of the rocket. Tumble recovery is used for some very light model rockets. When the engine fires its ejection charge the engine is ejected, resulting in an unstable rocket. The unstable rocket tumbles to earth.

Drag recovery works in much the same manner except that the rocket body tube acts as the drag inducing device. In this type of recovery system the engine ejects, but it is held fastened to the body tube by a shock cord. The last method is the boost glider recovery system which changes the rocket into a glider after the rocket engine has burned out.

Stability: Rockets must be stable before they can fly. It is dangerous to try to fly a model rocket that is not stable. The swing test is an easy way to determine if your model rocket is stable.

Here is how the test works. Prepare the rocket for launching, including the installation of the engine, wadding and parachute. Tie a slip loop in the end of a six-ft. string, and tie it around the rocket body. Balance the rocket on the string by moving the loop on the body tube until the rocket hangs level. At this point swing the rocket around your head until it points in the direction of the swing. If the nose of the rocket does not point in the direction of the swing, then the rocket is not stable. If this is the case add weight to the nose area of your rocket. Continue adding weight until the rocket passes the swing test.

Remember, after adding weight to the nose of the rocket, you must balance the rocket again before attempting the swing test. Also be sure that no one is in range of the rocket as it is being swung—even a tethered rocket can hurt.

Group Flying: It is always more fun to fly your model rockets with your friends. In this way you can compete in a friendly manner to determine who can achieve the highest altitude, who can gain the longest duration, who can lift the greatest weight to a predetermined height.

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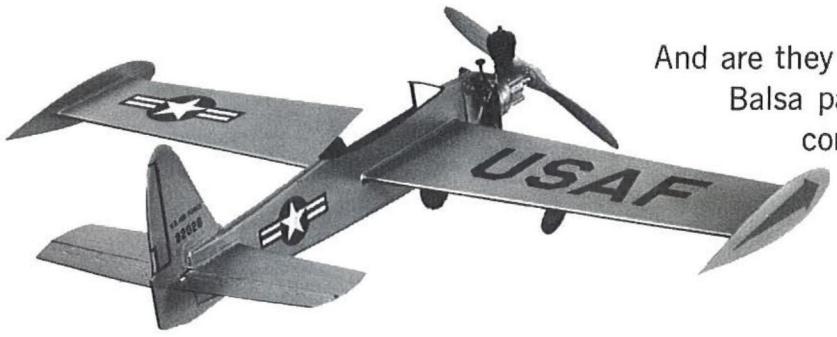
if you want some fun

. . . then go out and get yourself one or more of these nifty little Control Line models. And are they simple! Kits contain from 6 to 9 die-cut Balsa parts as well as the metal engine mounts, complete Control System (less lines and handle), Landing Gear, Wheels, authentic Decals, etc., all ready to use, which makes assembly a cinch IN ONLY MINUTES!



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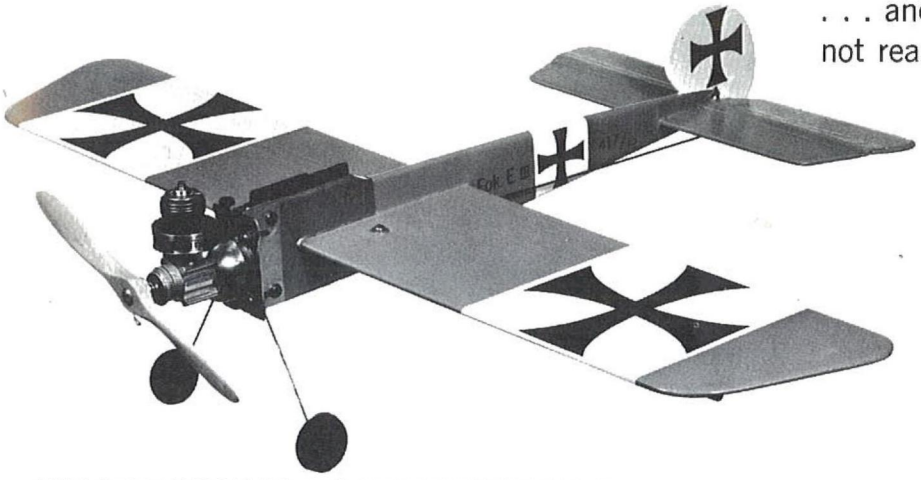

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Plans are easy to read and complete. They even have a run-down on beginners' first time flights. There are nine models at $3.50 and one Bipe (double winger) at $3.95, all about 21" wing span; and all the tools you need are generally found around the house.

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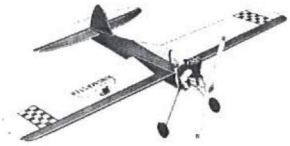

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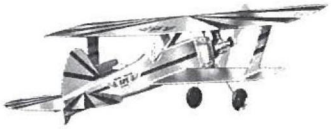

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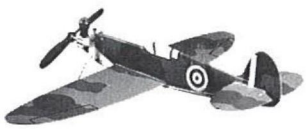

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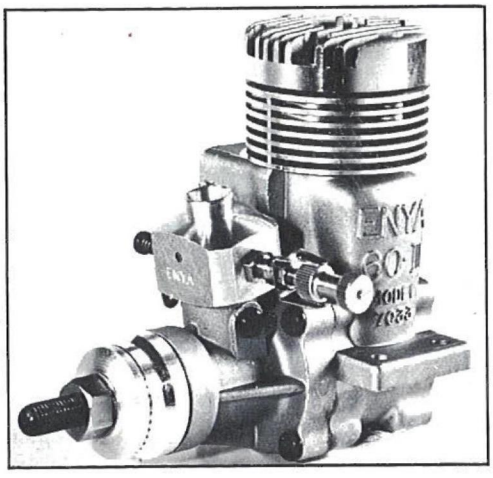

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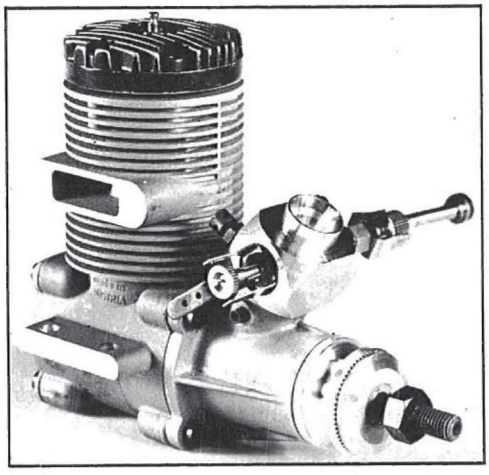

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